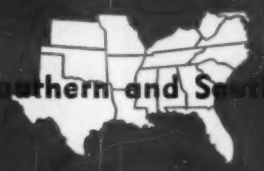
ELECTRICAL SOUTH



Serving the 18 Southern and Southwestern States

Automation through electronics — a new series beginning on page 28

DECEMBER, 1954

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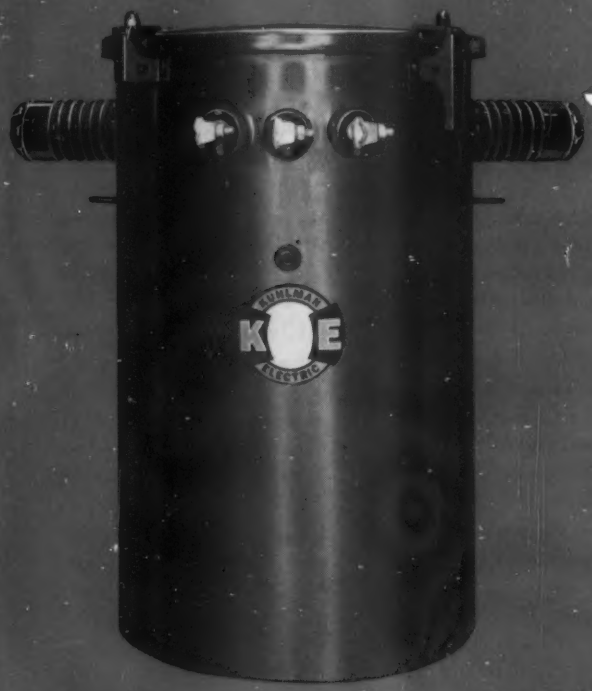

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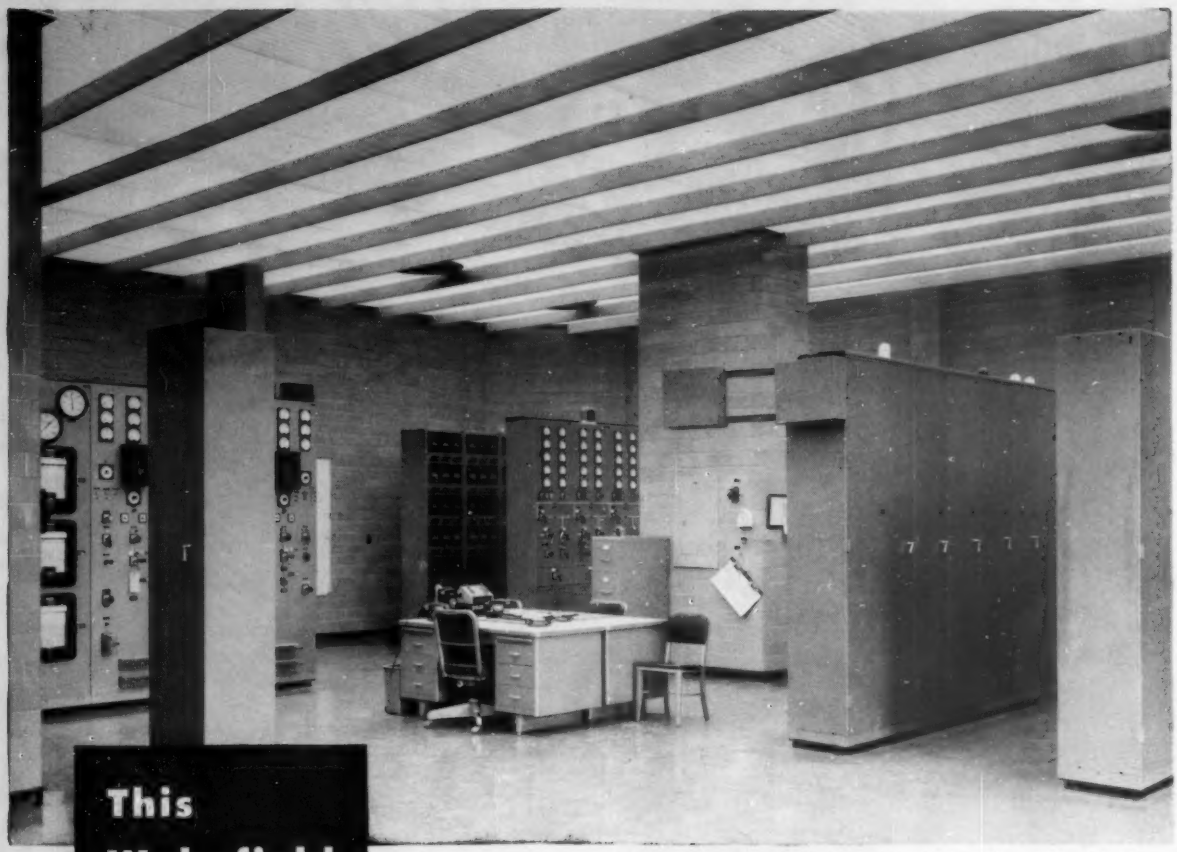

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Volume 34 Number 12

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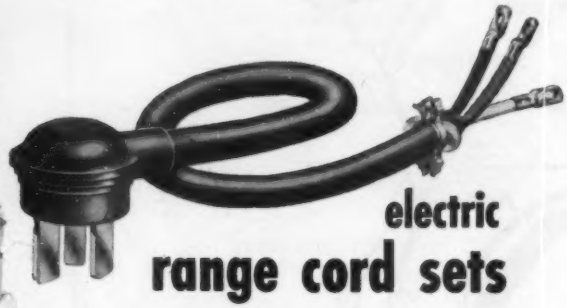

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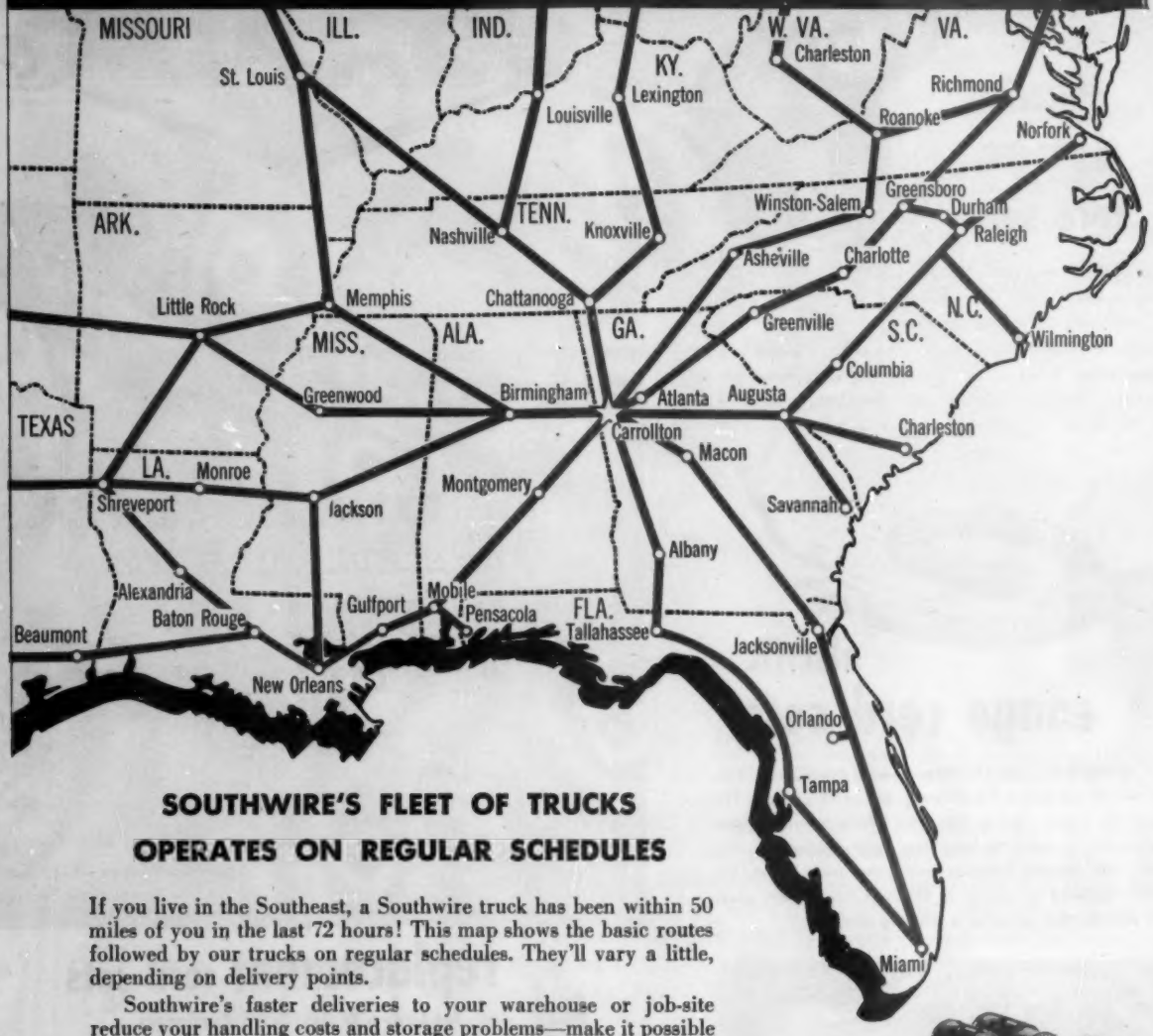

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ELECTRICAL SOUTH

SERVING THE 18 SOUTHERN AND SOUTHWESTERN STATES

December, 1954 — Vol. 34—No. 12

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***These departments will be resumed in January.**

TO HELP THE BUSY READER—

Electrical contractors who find it difficult to sell building contractors on the idea of including adequate wiring in their houses, will be interested in the story of **how one electrical contractor is selling adequate wiring.** L. H. Casteel of Columbia, Mo., has had some highly interesting results with his plan discussed in detail on **page 18.**

R. W. Wilson, expert in the field of wiring, a member of the Wiring Committee of Edison Electric Institute, and the Plan Committee of the National Adequate Wiring Bureau, maintains in his article beginning on **page 22** that **wiring costs are not too high.** Mr. Wilson complains that local restrictive ordinances are raising costs unnecessarily in some communities.

Residential lighting involves a number of factors that contractors do not meet under commercial and industrial conditions. A Maryland contractor gives a comprehensive discussion of these **specific problems of residential lighting** on **page 24.**

The story of **how an Alabama contractor pioneered electric radiant heating** is told in the article beginning on **page 27.**

Part I of a series of articles on **automation through electronics** will be found on **page 28.** These articles will outline with illustrative examples how automatic operation in industry can be achieved through the application of a few relatively simple pieces of electronic apparatus.

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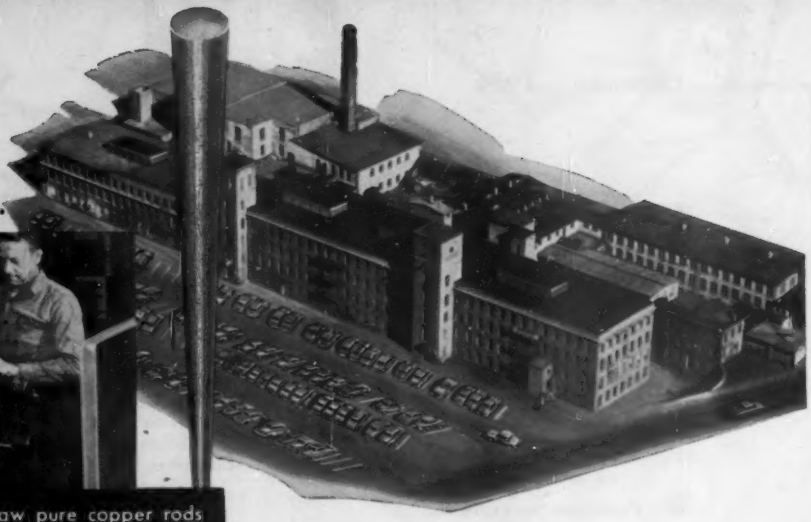

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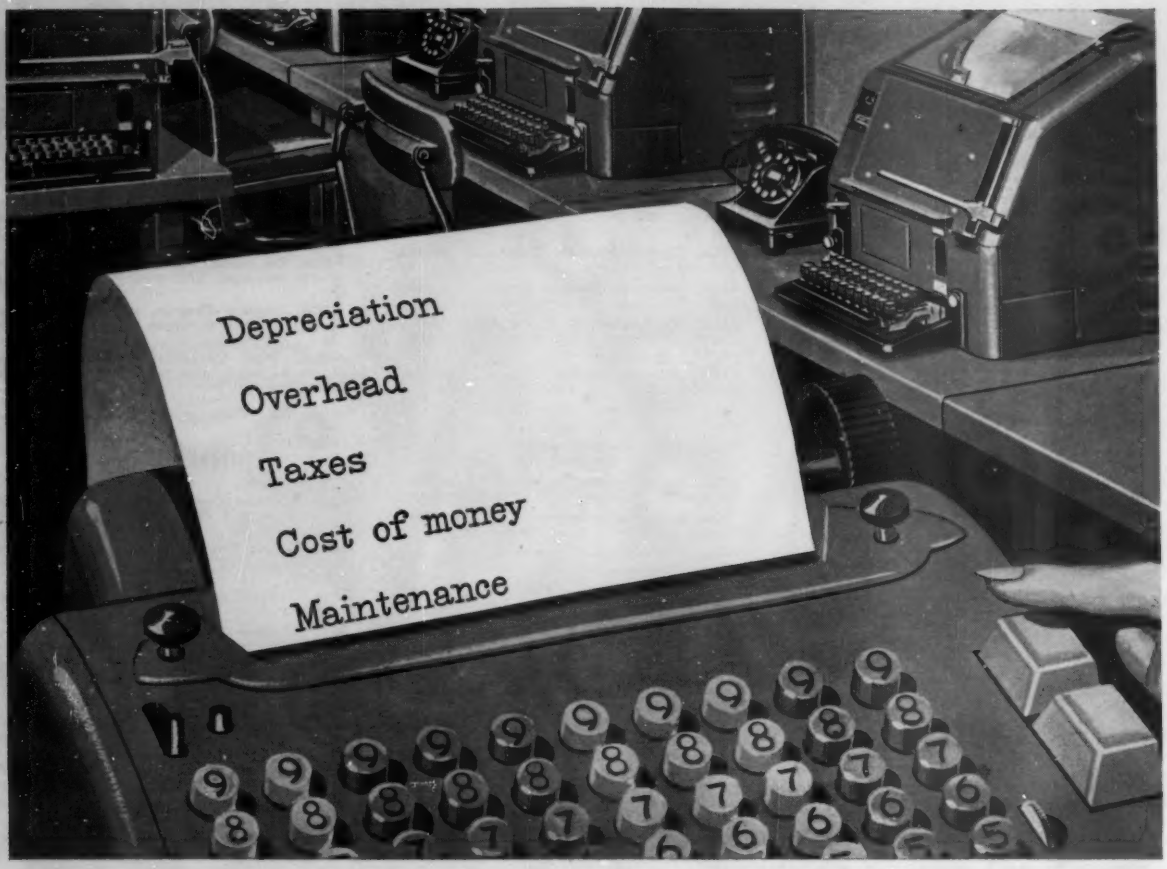

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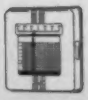
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B-M *Fittings*

ARE APPROVED AS CONCRETETIGHT

When setting E. M. T. in concrete you can make each job easier and more profitable by using Briegel All Steel Indenter Fittings that have UL approval as CONCRETE-TIGHT. Contractors the world over recognize their cost cutting qualities and the fact that they make each wiring job a better job. It is only natural that Briegel Fittings are the most widely-used E. M. T. connectors and couplings.

Cross Section Showing Indentations.

All B-M Indenter Fittings are U. L. approved as Concrete-tight and for General Use. (File Card E 10863). Also comply with Federal Specifications W-F-406.

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

Warehouse Stocks in Principal Cities for Immediate Delivery!

Leading Manufacturers of Fluorescent Tubes say:

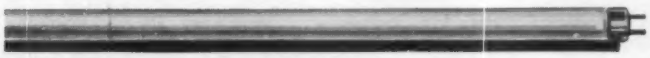
CERTIFIED CBM CERTIFIED by ETL BALLASTS

are Tailored to the Tube

No one knows better the value of CERTIFIED CBM BALLASTS than the manufacturers of fluorescent tubes. For the satisfactory performance of their lamps is vitally dependent on the ballasts that operate them. Here's what they say:

CHAMPION *says:*

"Fluorescent lamps are designed to operate at specific electrical values. The use of auxiliary equipment that has been proven to meet these agreed upon standards will assure the user maximum value for his lighting dollar with a minimum of operational failures. Certified Ballasts are inexpensive insurance."

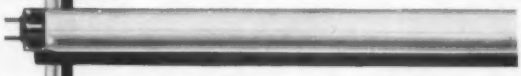


GENERAL ELECTRIC *says:*

"The life and light output ratings of fluorescent lamps are based on their use with ballasts providing proper operating characteristics. Ballasts that do not provide proper electrical values may substantially reduce either lamp life or light output, or both. Ballasts certified as built to the specifications adopted by the Certified Ballast Manufacturers (CBM) do provide values that meet or exceed minimum requirements. This certification assures the lamp user, without individual testing, that lamps will operate at values close to their ratings."

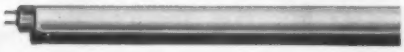
SYLVANIA *says:*

"The light and life ratings of fluorescent lamps are based on three hour burning cycles under specified conditions and with ballasts meeting American Standards Association specifications. Ballasts marked with the CBM emblem and certified by Electrical Testing Laboratories, Inc., meet ASA specifications."



WESTINGHOUSE *says:*

"Use ballasts that are tested and Certified by Electrical Testing Laboratories or ones that are otherwise known to meet the specifications of the lamp manufacturer. These will give best results with Westinghouse fluorescent lamps."



By using fluorescent fixtures that are equipped with CERTIFIED CBM BALLASTS you are assured long lamp life, full light output and trouble-free operation.

That's why CERTIFIED CBM BALLASTS merit the slogan—Tailored to the Tube.

CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO

CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1008—Motor Starters

A new bulletin, Number 514-515, has been issued by the Industrial Controls Division of Federal Electric Products Co., 1429 Park St., Hartford 6, Conn. Describing in detail the company's line of combination motor starters, the booklet is copiously illustrated with photos of the various types available and includes detail drawings of special features.

1030—Lighting Catalog

An eight-page descriptive bulletin issued by Pittsburgh Reflector Co., 450 Oliver Bldg., Pittsburgh 22, Pa., describes in detail the most popular items in the Pittsburgh line of fluorescent and incandescent lighting equipment. Each item is fully illustrated and cataloged and many are accompanied by installation plans.

1032—Receptacles and Plugs

Russell & Stoll Co., Inc., 125 Barclay St., New York, N. Y., has released a bulletin, No. EL-4-46, describing the new Ever-Lok receptacles, plugs and cord connections for 30 amperes, 440 volts, a-c. Typical uses are for heavy duty industrial purposes.

1048—Plug-In Strip

An illustrated catalog showing the complete "Plug-in" Strip line has recently been published by National Electric Products Corp., Pittsburgh, Pa. This eight-page illustrated brochure pictures the three and six foot standard lengths of the multi-outlet branch circuit assembly.

1054—Fluorescent Fixtures

Catalog No. 53 illustrates 74 pages of commercial and industrial designs. Featuring all types suitable for schools, industrial and commercial buildings, retail stores, etc. This catalog is available from the Kayline Co., 2480 E. 22nd St., Cleveland 15, Ohio.

1058—Conductor Fittings

A complete catalog, illustrated and listing prices, has been issued by Penn-Union Electric Corp., Erie, Pa. Described is the company's complete line, including a wide variety of service connectors, terminals, tees, and taps; also many other types of conductor fittings.

1076—Modular Lighting

A 20-page booklet containing interesting and useful information about the "modular system" of lighting can be obtained by writing to the Mitchell Manufacturing Co., 2525 Clybourn Ave., Chicago 14, Ill.

1082—Lighting Equipment

Preprints of the F. W. Wakefield Brass Co.'s eight-page section on lighting which will appear in the 1954 Sweet's Catalog are available on request to Wakefield, Vermilion, Ohio. Included are descriptions of 11 major types of lighting equipment.

1086—Cable Connectors

Tomic Sales and Engineering Co., 4864 Woodward Ave., Detroit 1, Mich., now have available catalog sheets containing data on the complete line of their connectors, couplings, and cable connectors.

1088—Fittings and Fixtures

A 32-page illustrated catalog covering Killark fittings and fixtures is offered by Killark Electric Mfg. Co., Vandeventer and Easton Aves., St. Louis 13, Mo.

1090—Midget-Size Busduct

Complete information on Power Plugin, the new, midget-size busduct, is found in bulletin No. 720, available from Frank Adam Electric Co., 3650 Windsor Pl., St. Louis 13, Mo.

1092—Electrical Boxes

Steel City Electric Co., 1207 Columbus Ave., Pittsburgh 12, Pa., offers a catalog of their complete line.

1110—Aluminum Cables

A new 16-page booklet, OK-1070, published by the Okonite Co., Passaic, N. J., contains the latest information on insulated aluminum power cables. It is based on two AIEE papers and reviews the properties, problems and advantages.

1130—Conduit Fittings

The latest completely illustrative catalog on their diversified line of conduit fittings is announced by the Atlantic Conduit Fittings Co., 589 Atlantic Ave., Boston 10, Mass.

1136—Space Heating Guide

Cavalier Corp., Chattanooga 2, Tenn., has prepared a Guide for Cal-

ELECTRICAL SOUTH
806 Peachtree St. NE
Atlanta 5, Ga.

December, 1954

Gentlemen:

Please send me the bulletins and catalogs indicated.

(Print Plainly)

Name ..... Title .....

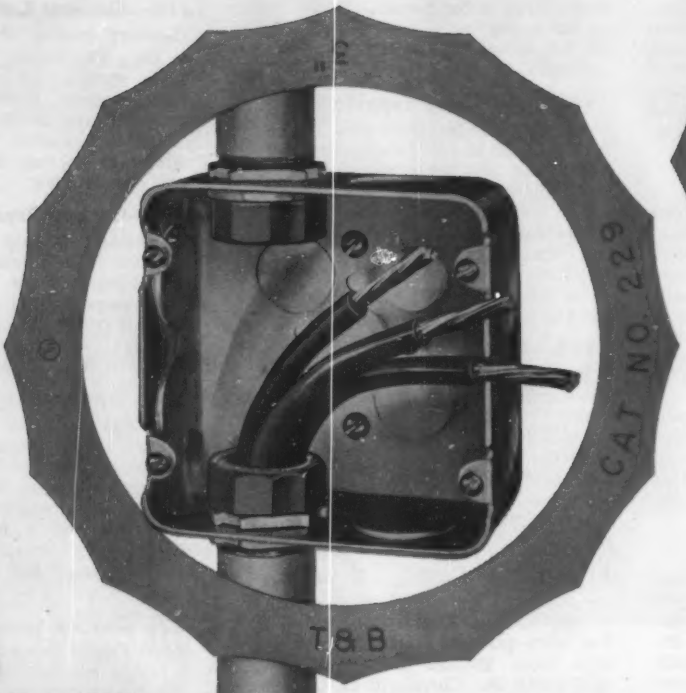
Company .....

Address .....

City & State .....

Circle numbers below. Bulletins and catalogs will be mailed promptly.

1008	1030	1032	1048	1054
1058	1076	1082	1086	1088
1090	1092	1110	1130	1136
1150	1156	1166	1172	1178
1182	1184	1186	1188	1190
1192	1198	1200	1202	1204
1208	1214	1218	1220	1222
1224	1228	1230	1232	



NEW T & B INSULATING BUSHINGS
for ½" to 6" Standard Rigid Conduit

T&B ENGINEERED

TOUGH...

BEND 'EM, POUND 'EM, TWIST 'EM

These new T & B Insulating Bushings are designed to withstand rough treatment. Made of tough cellulose acetate butyrate, they're the toughest Insulating Bushings available today.

Use T & B's new Insulating Bushings wherever NEC requires protection for cable sheath or wire insulation against damage from burred or unevenly cut conduit... or for the ultimate in protection even where not required. Send today for a free sample and descriptive literature.

Toughest Insulating Bushing Available Today... Can be used over and over again... shatterproof.

Vibration-Proof... Easily installed by hand, yet a wrench is needed to take them off. Bushing threads *lock* onto conduit.

Resists Corrosion... Unaffected by common acids, solvents, moisture or fumes.

Blue Color... Provides easy identification for electrical inspectors.

LOOK FOR THIS SIGN—

AUTHORIZED DISTRIBUTOR T&B ENGINEERED

IT'S THE MARK OF AN AUTHORIZED T & B DISTRIBUTOR

The complete line of T & B fittings for conductors and raceways is sold only by recognized electrical wholesalers. It's our way of assuring you the service and savings of a friendly local source. Call him for all your electrical needs. T44

THE THOMAS & BETTS CO.

INCORPORATED
22 Butler Street • Elizabeth 1, New Jersey
Thomas & Betts Ltd., Montreal, P.Q., Canada
MANUFACTURERS OF FINE ELECTRICAL FITTINGS SINCE 1898

culations of Electric Space Heating. It is based on study of several thousand installations of electric heat and is a handy reference for calculating electric heating requirements and estimating operating costs. The booklet contains discussion, charts, and floor plan examples.

1150—Fluorescent Fixtures

Colorful, 20-page catalog. Front cover shows interesting illustration of "Light through the Ages." Catalog gives complete specifications and pictures of entire Naturlite line manufactured by Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn.

1156—Industrial Lighting

The new Abolite Catalog and Handbook contains a complete descriptive story of all commercial, industrial floodlighting equipment manufactured by Jones Metal Products, Inc., West Lafayette, Ohio.

1166—Electrical Fittings

A 40-page illustrated catalog and price list on the Gedney line. Shown and listed are conduit, threaded entrance, SEC, EMT and ground fittings, and box connectors for both armored and non-metallic cable. Copies are available from Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

1172—Busduct Manual

A 68-page manual, Bulletin No. B-4272A, describing types of busduct and accessories available, and presenting application and test data, specifications, and information on pricing a typical busduct installation is available from Westinghouse Electric Corp., Box 2099, Pittsburgh, Pa.

1178—Remote-Control Wiring

Bulletin 16-200 is a 36-page manual describing layout and installation of remote-control wiring, and is available from General Electric Co., Construction Materials Dept., Bridgeport 2, Conn. Advantages and explanation of the system are followed by illustrated installation procedure.

1182—Switch Insulators

A new bulletin giving specifications, engineering data, contours, dimensions, etc. on its full line of Switch and Bus Insulators has been recently published by Victor Insulators, Inc., Victor, N. Y. Write for Bulletin No. 5 or use reply coupon.

1184—Approved RHW Wire

Bulletin No. 1018 describing first Underwriters' Approved Type RHW Wire, developed to meet the new National Electrical Code standards, is available from Simplex Wire and Cable Co., 79 Sidney St., Cambridge 39, Mass.

1186—Electric Heating File

This file offered by Electromode Corp., 45 Crouch St., Rochester 3, N. Y., is made up to suit individual requests for information on Electromode Heaters for domestic, industrial or farm use; or to contain material on the complete Electromode line if desired.

1188—Dry-Type Transformer

An eight-page illustrated booklet on the Type E, totally-enclosed, nonventilated dry-type transformer is available from Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa. Made in ratings from three to 50 kva, the transformer provides greater economy for plant distribution systems where dirt, lint, and non-explosive dust are a problem.

1190—Electrical Fittings

Blackhawk Industries, Dubuque, Iowa, offer a new two-color bulletin describing and illustrating B-I Electrical Fittings and Fixtures. Included are conduit and cable fittings, conduit and cable straps, staples, box supports, sill plates, locknuts and bushings, wire holders and yard lights.

1192—Wire Pulling Lubricant

Illustrated six-page folder showing the advantages of an improved Y-Er Eas wire pulling lubricant is available from Electro Compound Co., 3812 150th St., Cleveland 11, Ohio.

1198—Wire Handling Devices

Clyde W. Lint, 2323 W. 18th St., Chicago 8, Ill., manufacturers of the Jiffy Line of wiring handling devices, has issued a three-page catalog insert of descriptions and price schedules for the materials in the Jiffy Line.

1200—Fluorescent Fixtures

Complete information on commercial fluorescent and incandescent lighting of all types, for offices, schools, libraries, etc., and all industrial locations available from Benjamin Electric Manufacturing Co., Leader Div., Northwest Highway, Des Plaines, Ill.

1202—Code Explanation

Bulletin 2660 contains up-to-date information (following 1953 Code revision) on why equipment for hazardous locations is designed and built as it is, and is available from Crouse-Hinds Co., Wolf & 7th, No., Syracuse 1, N. Y.

1204—Conduit Fittings

Illustrated Catalog available upon request to Electrical Fittings Corp., Woodside, N. Y., or their nearest warehouse in your locality contains complete information on the company's electrical conduit fittings, conduit nipples, couplings, and elbows.

1208—Contemporary Lighting

Two brochures describing contemporary lighting fixtures for residential, commercial and display purposes. Included are sizes, types, framing-in details, illustrations. Prescolite Mfg. Corp., 2229 Fourth St., Berkeley 10, Calif.

1214—General Catalog

General catalog of Royal Electric Co., Inc., Pawtucket, R. I., covering flexible service and lamp cords, cord sets, extensions, trouble lights, wiring devices and decorative Christmas lighting is available to wholesalers. Dealer catalogs may be secured from Royal distributors.

1218—Carbon Products

A 28-page catalog on Motor and Generator Brushes and carbon products telling how to order brushes, grade recommendations, characteristics and description of brush grades is available from the Helwig Co., 2536 North 30th St., Milwaukee, Wis.

1220—Stadium Lighting

The Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill., announces the availability of a new eight-page bulletin, No. 605, on stadium lighting, describing in detail floodlighting of a typical outdoor athletic arena stressing the importance of using fully enclosed floodlights.

1222—Carbon Lamps

Nalco Candylbeme decorative carbon lamps are the subject of a new leaflet which is now available from North American Electric Lamp Co., 1014 Tyler St., St. Louis, Mo. Descriptions, specifications, and list prices are given for the lamps.

1224—Electrical Equipment

The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment, Distribution Panels and "E-Z-RED" Circuit Breakers.

1228—Time Controls

A revised and enlarged edition of the booklet "How Time Controls Save Work, Time and Money on the Farm" has been announced by the Paragon Electric Co., Two Rivers, Wis. The revised edition includes new time control applications devoted to showing farmers how to earn more money by actually doing less work.

1230—Hot Line Repairs

Twenty time-saving techniques for making hot line repairs and replacements are detailed in a new 72-page, spiral-bound, pocket-size book for on-the-job use. Included are useful charts giving the characteristics of all bare conductors. Copies are available from James R. Kearney Corp., Dept. HF, 4236 Clayton Ave., St. Louis 10, Mo.

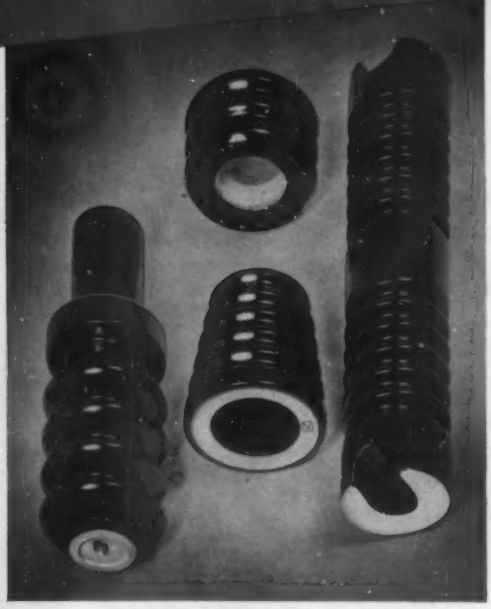
1232—Electrical Controls For The Textile Industry

Fully described in 8-page circular by The Arrow-Hart & Hegeman Electric Co., Hartford 6, Conn. Includes: shock-resistant, lint-proof Loom Switch and also Starters, Contactors and Combination Starters in lint-proof NEMA XII enclosures.

Continuous laboratory testing and special treatment of water make possible Victor *Purified* Porcelain

Another Reason Why—

VICTOR Makes Better Insulators



Victor manufactures many special shapes in addition to a complete line of standard porcelain for transmission and distribution.

ONLY VICTOR MAKES

PURIFIED PORCELAIN

Many milestones in insulator progress have been due to VICTOR research. But none is as important as its development of *Purified* Porcelain. By specially treating the water used in the manufacture of VICTOR Insulators and employing many other ceramic advances, VICTOR gives you the finest insulator porcelain ever made—porcelain which, for the first time in the industry, is *pure* porcelain all the way through!

Purified Porcelain has vastly greater uniformity in mechanical and electrical strength values, higher mechanical impact and puncture voltage values, greater density, hardness and permanence than any other insulator porcelain. That's why more and more power men are specifying VICTOR *Purified* Porcelain Insulators.

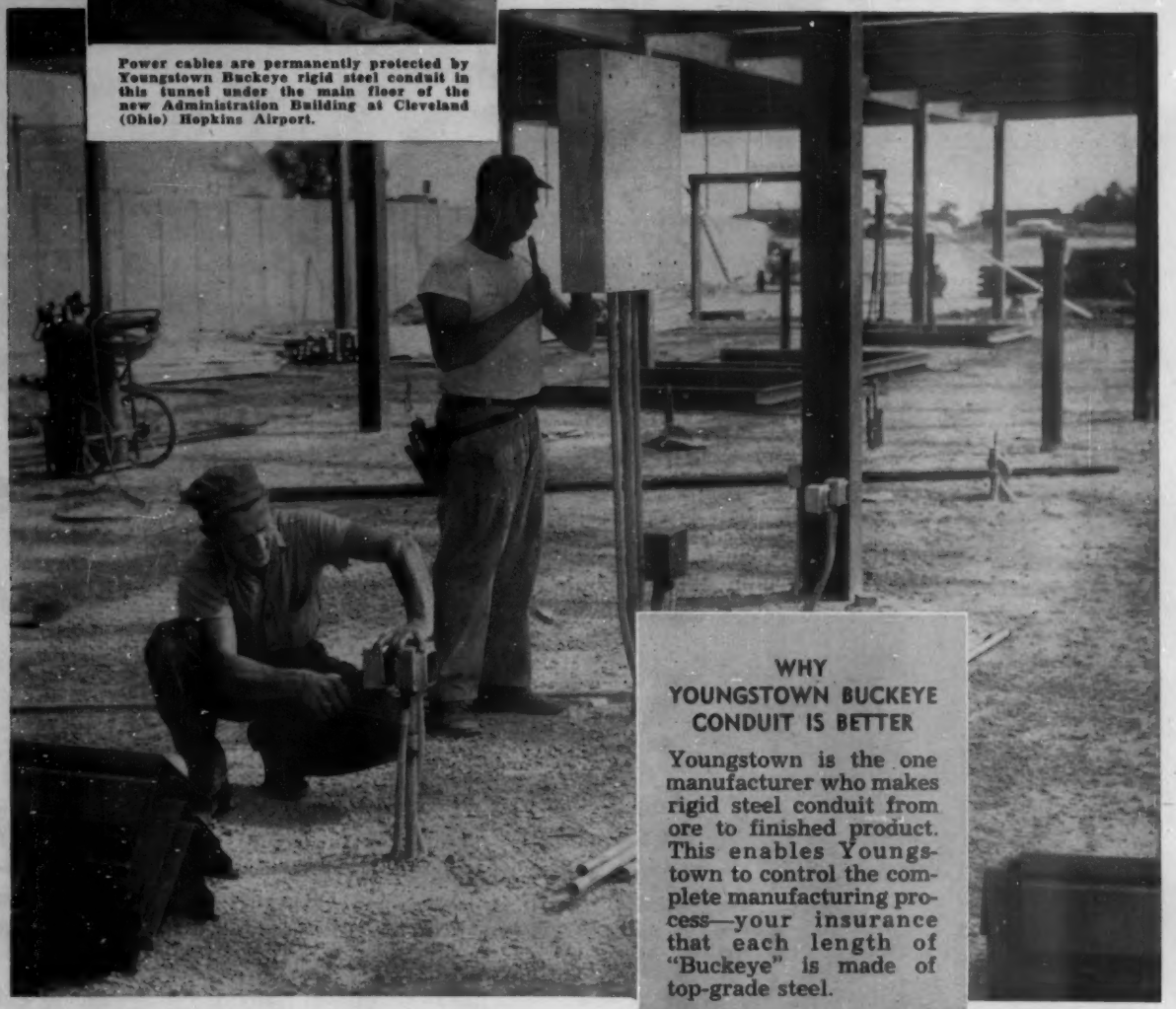
Specify VICTOR *PURIFIED* PORCELAIN INSULATORS

VICTOR INSULATORS, INC., VICTOR, N. Y.
SUBSIDIARY OF I-T-E CIRCUIT BREAKER CO.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators
Custom Designed Porcelain

65 tons of Youngstown Buckeye Conduit at Cleveland Airport

Power cables are permanently protected by Youngstown Buckeye rigid steel conduit in this tunnel under the main floor of the new Administration Building at Cleveland (Ohio) Hopkins Airport.



WHY YOUNGSTOWN BUCKEYE CONDUIT IS BETTER

Youngstown is the one manufacturer who makes rigid steel conduit from ore to finished product. This enables Youngstown to control the complete manufacturing process—your insurance that each length of "Buckeye" is made of top-grade steel.

Buried in these concrete floors and in tunnels—connected to pull boxes, base-plug boxes and lighting panels—are 65 tons of Youngstown Buckeye rigid steel conduit. "Buckeye" was specified for this Cleveland Hopkins Airport job because, above all, it's SAFE for critical wiring installations.

Youngstown

QUALITY YOUNGSTOWN SERVICE

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices: Youngstown, Ohio - District Sales Offices in Principal Cities

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - BAR SHAPES - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - RAILROAD TRACK SPIKES

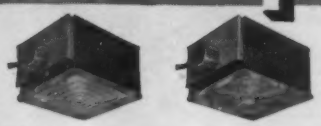
Guth

the complete line of fluorescents and incandescents

When you specify GUTH Luminaires, you get the benefit of more than a half-century's experience in pioneering better lighting. We make good specialized equipment for every lighting need... all *precision-planned* for economical installation and maintenance:

FLUORESCENT: Commercial and Industrial; Glass diffused, Eggcrate shielded, totally indirect, luminous indirect, recessed troffers and exposed lamp types.

INCANDESCENT: Commercial and Industrial; indirect, direct and semi-indirect types; also high bay reflectors, exit and utility lighting units.

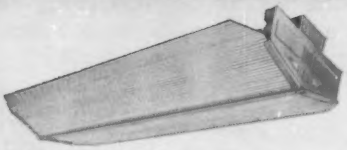


"ALL-SQUARE"...for recessing. One-piece die-cast frame. Light-leakproof. Widespread or concentrating lens... sizes 6½" sq., 8" sq. & 12" sq. PRE-WIRED. Removable top, and drop hinge bottom for servicing from above or below. Catalog 49.

▲ "ALL-SQUARE"

SEELUX ... totally indirect open bottom Luminaire for Silver Bowl Lamps, with modern ALZAK concentric louvres; for stem suspension or close mounting. Bulletin 864.

▲ SEELUX®

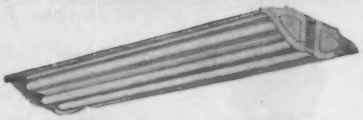


ARISTOLITE ...hinged glass panels swing open for easy cleaning from floor with handy servicing tool. Also with center Eggcrate louvres. For 2, 3 or 4 40-watt or 2 or 4 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Write for Bulletins 812 and 820.

▲ ARISTOLITE®

PEERLITE ...the new, ultra-modern fixture offering great flexibility. Forms any pattern—T, H, □, +, I. 20% uplight. Top plates available for 100% downlight. For 2, 3 or 4 lamps—4' or 8' long. Supplied with any type of louver or glass diffuser you wish. (Shown with new GrateLite** Louver-Diffuser.) Bulletin 911.

▲ PEERLITE *



TRUCOLITE ...versatile, highly efficient, semi-direct type; can be used open, with Eggcrate louvres or diffusing glass bottom. For 2, 3 and 4 40-watt lamps...also 2 and 4 4-ft. or 8-ft. SLIMLINE lamps. Ceiling or suspension, unit or continuous mounting. Bulletins 814 and 852.

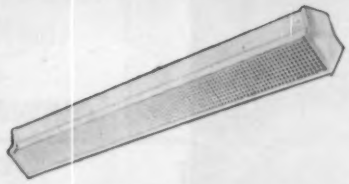
▲ TRUCOLITE®

GUTHLITE ... the revolutionary "Jacknife" Hinge Luminaire that swings down for easy relamping or cleaning right from the floor! For 2 40- or 2 85-watt or 2 4-ft. SLIMLINE lamps; ceiling or suspension, unit or continuous mounting. Simplest fixture to install. Bulletin 845.

▲ GUTHLITE®

WYTE-LINER ...white inside and outside (takes gloom off ceiling). AIRFLOW channel for longer ballast life. Reflectors 300° Permalux or Porcelain Enamel. Made in 2 and 3 40-watt, 2 85-watt, and 4- and 8-ft. SLIMLINE lamps. Easy to install and clean. Catalog 48.

▲ WYTE-LINER



"V" CORRIDOR UNIT... with GrateLite** Louver-Diffuser. Fills wide hallways and corridors with practical, wall-to-wall light. Lamps shielded by easily maintained GrateLite. Models: 4' & 8' for 1 or 2 lamps.

▲ "V" CORRIDOR UNIT

"LITE-BLOX" RECESSED TROFFERS... for 1, 2, 3 or 4 lamps: 20-, 40-, 85-watt, or 4-ft., 6-ft., or 8-ft. SLIMLINE. Exclusive end KO's provide exact 48.0"; modular design for unlimited patterns. Wide variety of shielding and diffusing glass panels available; also ALZAK reflectors if desired. Bulletin 869.

▲ "LITE-BLOX" RECESSED TROFFERS

LEADERS IN LIGHTING
Guth
SINCE 1902

GUTH 4-FT. SLIMLINE available in every GUTH fluorescent fixture

- no starters or starter troubles!
- easy to handle Single-Pin lamps!
- light in two steps almost instantly!

* Trademark
**U.S. & Can. Pats. Pend. Trademark Registered

THE EDWIN F. GUTH CO. / ST. LOUIS 3, MO.

CROUSE-HINDS rigid quality control *assures long-lasting products ...* CONDULET* records prove it!

Making a tensile strength test of a Feraloy bar in the Mechanical Laboratory. Constant testing insures uniform quality.

A hydrostatic test of a Type EPC explosion-proof Condulet. It must withstand a pressure 4 times as great as an internal explosion.

Gauging the threads of an Obround Condulet in the factory. Crouse-Hinds quality control follows through to the finished product.

The first CONDULETS, introduced by Crouse-Hinds in 1905, were so well designed and so carefully manufactured that many of the early installations are still in use.... still giving dependable service after more than forty years. This record proves that where quality counts, you can count on CONDULETS!

Crouse-Hinds high standard of quality has always been controlled by careful checking and testing of both raw materials and the finished product. The CONDULET line has expanded from a few items to more than 15,000 types and sizes and the testing laboratories have kept pace with this development. They contain the latest and most modern testing equipment.

Laboratory testing is only part of Crouse-Hinds system of rigid quality control. Factory inspection is equally important. Together, they assure a superior product that will serve you better . . . and last longer!

Always specify CONDULETS.

***CONDULETS are made only by CROUSE-HINDS**

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

OFFICES: Amarillo — Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Memphis Milwaukee — New Orleans — New York — Philadelphia — Pittsburgh — Portland, Ore. San Francisco — Seattle — St. Louis — St. Paul — Tulsa — Washington.
RESIDENT REPRESENTATIVES: Albany — Atlanta — Baltimore — Charlotte — Chattanooga Corpus Christi — Reading, Pa. — Richmond, Va. — Shreveport
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

Type LB Obround Condulet

Type EVA Explosion-Proof Lighting Fixture

Type GUAC Explosion-Proof Junction Condulet

Type ARE Plug Receptacle

Type FSC Tumbler Switch Condulet

CONDULET
First in the field
STANDARD OF QUALITY

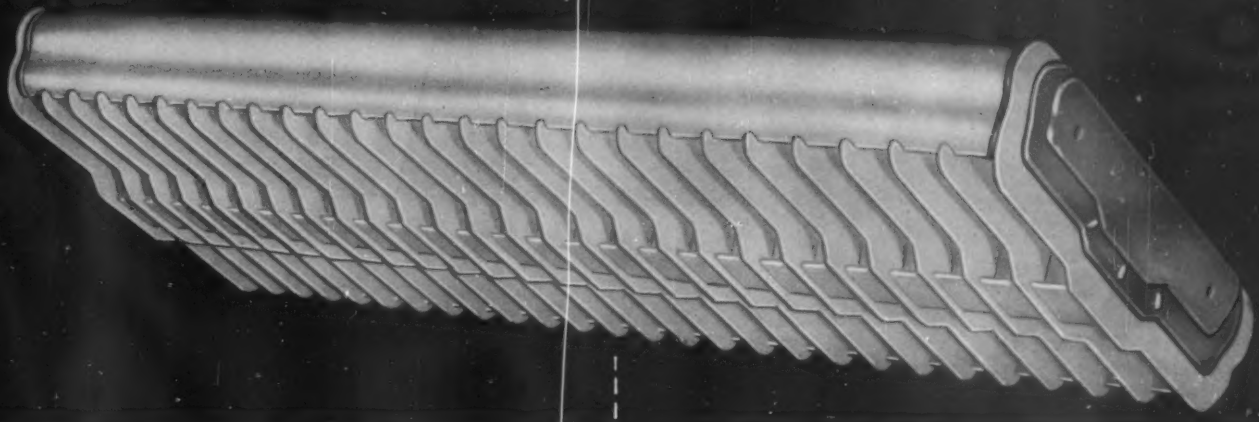
A Nationwide Distribution Through Electrical Distributors

AIRPORT LIGHTING · FLOODLIGHTS · CONDULETS · TRAFFIC SIGNALS

Flexibility PLUS

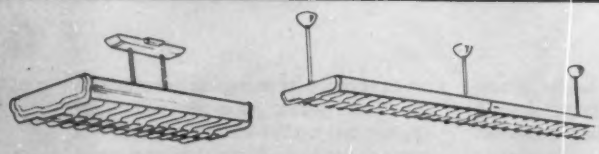
FOR TODAYS MOST EFFICIENT COMMERCIAL LIGHTING

Wheeler FLO-LINER

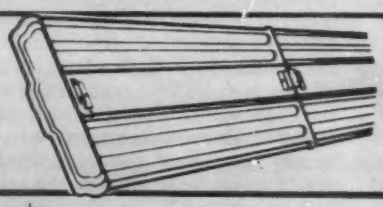


SHIELDING — All fixtures provide 45° crosswise shielding and are available with choice of 25° or 45° lengthwise shielding.

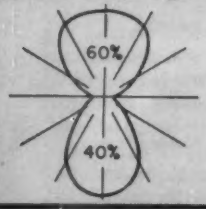
END CAPS — Satin finish aluminum end caps available — order separately.



PENDANT MOUNTING — Stem hanger assemblies are required. Single stem hangers used for continuous row mounting. Twin stem hangers for the mounting of individual 48″ lamp fixtures.



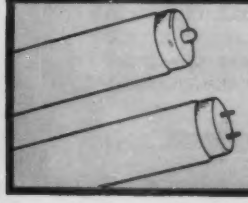
SURFACE MOUNTING — Units may be attached directly to the ceiling. Available as optional equipment are surface mounting plates and top reflectors.



OK

A quality fixture throughout!

85% EFFICIENCY — Translucent plastic side panels and center panel give low brightness for more comfortable seeing and high efficiency. Made of sturdy Polystyrene, they will not warp or discolor. For further seeing comfort 60% of the light is directed above the horizontal.



FIXTURES — 2 lamp and 4 lamp units available for 48 inch 38 watt and 96 inch 74 watt single pin lamps, as well as 48 inch 40 watt bi-pin lamps.

DISTRIBUTED EXCLUSIVELY THROUGH ELECTRICAL WHOLESALERS

Wheeler REFLECTOR COMPANY

275 CONGRESS STREET, BOSTON 10, MASS.

Material goes to the job in well-stocked utility trucks. Bob Pauley hands material to Wallace Casteel for the house which the Casteel Company has contracted to wire. New homes make up a good many of their jobs.

How one electrical contractor

◆ MOST ELECTRICAL CONTRACTORS who do business with building contractors soon learn that many are hard to sell on the idea of including adequate wiring in their houses, particularly contractors who are promoting blocks of houses and new subdivisions. The pat answer when the electrical contractor suggests a heavier entrance to provide for such accessories as air conditioning, dishwashers, and garbage disposals, is that a fixed amount for minimum wiring has been included in the cost price of the dwelling and it cannot be changed.

Basis for bids

Electrical contractors doing a volume business with building contractors may not be able to press their suit for more adequate wiring because the builder may get another electrical contractor.

The same situation exists when an electrical contractor makes a competitive bid. He must base his bid on the minimum requirements and not on what he thinks it should be. The builder may ask for bids on a 60-ampere entrance when the eventual owner of the house who buys it from the builder may soon need a 100-ampere entrance and twice as many branch circuits as are available.

L. H. Casteel, owner of Casteel's Electric Contracting Co., Columbia, Mo., is a contractor who has been able to sell adequate wiring to a number of building contractors with highly interesting results.

Mr. Casteel suggests changes when he figures the job for a builder because at that time the builder can include a bigger wiring job since he has yet to make up his complete cost figure.

Casteel points out to the building contractor that adequate wiring in the first place provides an ideal opportunity to promote repeat business. The eventual owner will tell his friends. Casteel finds it effective to remind the builder of the hundreds of homes built during the past 10 years which did not have adequate wiring, which had to have heavier entrance wiring before they could use even an air conditioner.

Talk selling points

He points out to the builder that adequate wiring provides several important selling points. For instance, a 100-ampere service entrance and underground cable insures that almost anything can be added to the wiring without calling in an electrician. The builder can tell the prospective buyer of the home that it has been wired for electric stove, garbage disposal,

The underground service starts from the meter loop and switch box on the pole. Mr. Casteel makes hook-up.

Underground service is brought in in conduit imbedded in the foundation wall. No. 4 cable is used.

is selling adequate wiring

by L. H. Houck

dishwasher, automatic laundry, air conditioning, circulating fan, television and that whether or not he wants to buy all these now, he can merely plug them in when he does.

Mr. Casteel says that most builders, whether they build to sell or for their own residence, seem to spend money right and left for almost every convenience except adequate wiring. He blames this on the fact that the general public is not fully aware of the importance of having an adequate sized service entrance, enough branch circuits and a properly balanced wiring system.

Blanket requirements

Columbia because of Missouri University, Stephens College and Christian College, has a heavy fluctuating population, and no two families have the same electrical needs. As an answer to all the needs of all families who move in, Casteel recommends that each new house wiring job, apartment house, or remodeling job be made three-wire 220 volts and that the circuits be balanced for the 110-volt uses by dividing up the load on either side. If more jobs were considered from this angle it would give the utilities a better balanced load.

One of the most desirable features for a home in the $16,000 to $60,000 class, Mr. Casteel believes, is buried service wires, but it is one of the hardest items in adequate wiring to sell. The main reason is that most utilities will provide free wiring to the outside of the house at the service entrance with overhead wiring but do not pay any portion of the buried service beyond the property line. Nevertheless Casteel has many underground lines jobs to his credit.

Whenever possible Mr. Casteel advocates a 100-ampere three-wire service and buried lead-in lines. This adds materially to the job and also adds much to owner pride and satisfaction.

A representative job of this type was underway when he was interviewed. The home was in the $40,000 class. The 100-ampere service came down a pole at the property line to the meter and then to a switchbox. Three No. 4 wires were placed in a trench leading to the concrete foundation where they were brought up to the basement entrance panel location. All wiring in the concrete was in steel tube. Direct burial wire was used on this job and many others and there have been no call backs for underground wiring trouble.

The extra high temperatures of this hot summer, often 115 degrees, has served to point up the need in

(*Continued on page* 82)

This workman's visual task involves scribing a groove about ¼ inch in depth into a black bees' wax impregnated with graphite and other chemicals. In the relighting scheme, he is provided with 300 to 500 ft-c of artificial light designed to eliminate glare.

By suspending the localized lighting in this part of the shop, it was found that job performance improved because the reflected image of the luminaire was increased in size, giving workmen freedom to shift work or posture. Three units were spaced to give 150 ft-c.

Providing adequate lighting for

◆ VISUAL TASKS of the employees of Dixie Electrotype Company, a 50-year-old Nashville firm which manufactures printing plates, vary to the extremes; that is, from the simplest to the most difficult.

Since the organization, operated by the same family which founded it, had been housed in the same building for all its 50 years, growth and expansion came by degrees. Consequently, lighting in the old building just happened rather than having been planned.

When it became evident that structural limitations of the old building would prevent satisfactory remodeling and would necessitate temporary closure of the business, a long term lease was taken on a nearby existing garage building fully planned for maximum utilization.

Lighting for individuals

In the old plant and office, localized lighting had been installed as it was required by the individual workmen. So lighting seemed the prime consideration in the company's desire to improve its housing condition.

The new home is a single floor plan of rectangular shape, having 30,000 square feet of space. The owners laid out the area proportions and process paths for the new building with full knowledge of the equipment sizes, normal operating flow of work, and the conveniences desired.

Because the owners were very conscious of the advantages of good lighting for their new plant, preliminary designs of the proposed lighting system were prepared and discussed not only with the owner but also with the workmen in the plant, particularly those concerned with the more difficult seeing tasks. Some of the workmen reported that they were unable to perform their tasks at night or on heavy overcast days. In the old building these men had their work stations located by outside windows in order to take advantage of the daylight.

In the new equipment layout, based on a planned pattern of product flow, these men were to be located at least 40 feet from the nearest window. The new locations presented a challenge.

With due consideration to the lighting problems, the proposed lighting plan was presented to the owner and discussed, and he authorized the ordering of materials and the preparation of the detailed plans for the installation.

Interesting aspects

Lighting of the plant was a problem of unusual nature and proved interesting in many respects. The main plant is one large open "L" shaped area, having the areas of critical seeing tasks primarily in three minor zones. Due to chemical fumes and foreign matter in the

For complete general office lighting at Dixie Electrotype, glass-enclosed two-lamp recessed units for 430-milli-amp T-12 slimline, mounted on six-foot centers, with an initial level of 85 ft-c, furnish an average of 65 ft-c maintained illumination.

In the composing area of the plant, best effects in type detail distinction are accomplished if the workman, task, and luminaire are so orientated that a specular reflection of the luminaire be given in the face of the type. The units were mounted on about 5½-foot centers.

intricate manufacturing processes

by S. B. LeCornu
Lighting Engineer
Nashville Electric Service
Nashville, Tenn.

air, it was decided that RLM porcelain apertured reflector units of two and three lamps would be used.

The composing area is one typical of the visual tasks in the plant. Some of the normal quality points of lighting do not apply to tasks here encountered. To accomplish the best effect in type detail distinction, it is necessary for the workmen, task, and luminaire to be so orientated that a specular reflection of the luminaire be given in the faces of the type.

Illumination details

This might be considered desirable reflected glare; however, it is necessary to equalize for the reflections of the tiny filets and rounded corners of the type that act as concave and convex mirrors and obscure the primary features of the type surface if the angulation is not right. Luminaires were mounted so that the reflection would be right, the units being approximately at equal centers as are the composing desks; that is, approximately 5½ feet on centers.

The work on type in the electrotype process at times is as small as four point; that is, having distinction details as small as one minute of an arc, no larger than a small needle. This sample of type illustrates the specular surfaces, highlights from reflection, and the obscurity of the details unless the angulation is right. Three light units were spaced to give a maintained level of one hundred and fifty footcandles. General lighting in the background gives fifty footcandles and is completely adequate except in some localized cases where supplementary units have been added.

The finishing areas' visual tasks are about the same as that of the composing desks. By suspending the localized lighting it was found that the job was done better as the reflected image of the luminaire was increased in size, thus giving the workman more freedom to shift his work or posture. The lighting level on the work benches in this case is two hundred footcandles along the wall and three hundred at the window wall on an overcast day. A job area which consisted of scribing a groove approximately ¼ inch in depth into a black wax material required special attention. The wax is bees' wax impregnated with graphite and other chemicals. The workman must see down into the groove to assure proper depth and a clean cut. It was decided that this job could be done better without the glare of the sunshine, and these workmen now have three hundred to five hundred footcandles of light for their tasks.

(*Continued on page* 81)

Wiring costs are *not* too high

when National Code rules are followed and restrictive ordinances are eliminated

by R. W. Wilson

Manager, Commercial Business Promotion and Development
Kentucky Utilities Co.

◆ THE PROBLEM of "Inadequate Wiring" (which problem has been with us for many years and which, like the proverbial Topsy — just grew) has grown to such proportions that it has finally gained national prominence and is getting number one attention from both the electrical industry and the consumer.

It is no secret that the electrical industry has known for these many years that inadequate wiring has been robbing the consumer of good, efficient service. To the contrary, many branches of the industry have been preaching the story continuously but the message seemed to fall on unattentive or unresponsive ears.

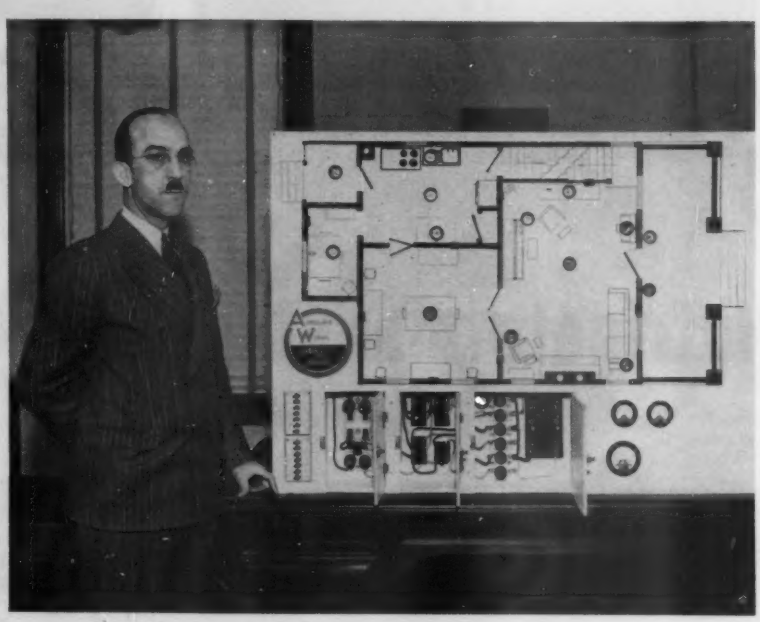
Increase in loads

However, as the constant effort of manufacturers continued to develop time-labor saving and comfort providing appliances and the consumer subsequently bought these new contributions to better living, the wiring systems in homes, apartment houses, public building, offices and stores became overloaded to the outside limit.

And while the need for better wiring is now being generally recognized, and public acceptance of the need has reached an all time high, an ugly snake raises his head to oppose better wiring by saying "it costs too much."

Several articles have appeared recently in various publications on the "High Cost of Wiring," with the result that many people have been led to believe that wiring costs are excessively high and out of reason.

It can be shown that this is contrary to the facts, except that in some localities wiring is "gold plated" in the sense that the cost is appreciably increased by local ordinance regulations which are in excess of National Electrical Code requirements, which excess contributes little or nothing to the safety or service of the installation.



Mr. Wilson has been particularly active in promoting adequate wiring for many years. His display boards and other devices used in talks to industry groups have demonstrated visually the advantages of wiring adequacy.

Such local ordinances increase wiring requirements, which in turn, increase both labor and material, thereby causing a *seemingly* "high" wiring cost. In such cases the wiring cost is not too high for the work done, but the ordinance requirements are too high.

For example, the National Electrical Code accepts non-metallic sheath cable as safe and serviceworthy where installing ranges. Some localities have written ordinances which require all range installations to be made in conduit. The cost of the conduit, the cost of the wire, plus the cost of installing added material makes this installation cost considerably more than non-metallic sheath cable, and adds nothing in the way of safety or service to the job. If a person chooses to use conduit all through his house, that is his prerogative, but such requirements should not

---

Mr. Wilson is a member and past chairman of the Wiring and Specifications Committee of Edison Electric Institute, and a member of the Plan Committee of the National Adequate Wiring Bureau.

be mandatory or compulsory in order to have a range installed.

In building a chimney, if the proper size tile is used for the flue, and the tile is faced properly with one facing of brick, and the installation is made in accordance with good practice, it will give good service, and will be considered safe. If a building owner desired to put two faces of brick over the tile, he would add nothing to the carrying capacity of the flue nor to the heating efficiency of the furnace. This could certainly be considered "gold plating" the job, if law required adding the extra facing. Of course, we would concede that there would be some added physical strength in the construction, which would be true if and where conduit is installed, but such requirements again should be left to the choice of the building owner, and should not be compulsory.

More materials required

There is no justifiable reason for adding anything to the installation which does not improve the safety factor or increase the carrying capacity of the wiring system. "Gold plating" practices always require more material which means more labor to install and a resulting high cost, with no additional benefits to the consumer.

Extravagant ordinances should never be passed. There may be a few local instances where special wiring requirements are justified, such as in fire zones or hazardous areas, but in most cases adherence to nationally recognized standard practices is sufficient from both a safety and serviceable standpoint.

The National Electrical Code will provide a safe electrical system, but it cannot anticipate load growth, new devices, etc. Real adequacy can be obtained only by using the principles of the Code and adding more wire, more switches, and more outlets properly arranged.

Excessive standards

Specific reference was made in one article to the excessive cost of re-wiring old installations for an electric range. Investigation of these specific cases disclosed again that local ordinances had established requirements which were considerably in excess of nationally accepted standard practice.

The price of such re-wiring jobs was not excessive, considering the material which was used and the amount of time required to install it, but from the standpoint of safety and service, the same job could have been done with considerably less time and material, and at a much lower cost.

Compare the facts

Today the cost of all commodities and services is higher than ever before, but an analysis of the situation will rather readily indicate that wiring has not increased as much as most other costs.

With all costs up, it is not unusual to hear the remark that this or that is "too high." Very frequently such statements are accepted as true, but they are often made without basis, without any knowledge of the facts or without any comparison with previous costs or consideration of the value of the service involved.

Anything is too much or too little only by comparison. Generally speaking, wiring costs have advanced since 1941, as have the costs of other services or commodities, if the comparison is made on equal installations requiring the same amount of material and the same hours of labor. But wiring costs have not increased to the extent that other building costs have. A house that was valued at $6,000 or $7,000 in 1939 will cost $13,000 to $15,000 today. This is an increase in total building cost of over 100 per cent.

On the other hand, electricity and electric service is one of the most important factors to be considered in building a home, but the cost of wiring (generally speaking) has only increased about 60 per cent.

Better installations needed

It has also been stated that it costs over twice as much to wire a house today as it did to wire the same size house in 1930. This may be true, but we must consider the increased amount of wiring required today over the requirements of 1930. Today is the day of electric living, and more and more of our services and comforts are provided the electric way.

In 1930 we did not have as many appliances or services dependent upon electricity as we have today. Consequently, the need for large entrance switches, numerous convenience outlets and big wire was not so essential. Today with the universally accepted use of stokers, attic ventilation fans, deep freeze storage units, coffee makers, three or more radios, drying lamps, ironers, roasters, electric blankets, ranges, larger refrigerators, water heaters, air conditioning units, and many other appliances, we find the need for heavy entrance switches, bigger wire and more outlets even in the same size house.

Why good wiring

The electric system is the nerve center of the home of today. It is the highway over which electricity must travel to the final outlet or point of use. The main switch is the doorway or entrance through which all of the electricity used in your home must pass. Today that entrance must be big because requirements are big. Much more than they were ten or twenty years ago.

The main circuits are the highways or express thoroughfares over which this heavy electric traffic must travel, and these highways must be big, too, to permit uninterrupted passage without resistance or bottlenecks. The branch circuits are side streets leading to the points of use and the multiple points of use today make necessary a greater number of side streets or branch circuits and convenience outlets. In brief, these are the increased requirements of the "same size house" today.

Local variation in cost

Then, too, it has been said that the same wiring job can be done cheaper in town A than it can in town B. This statement may be correct, but the same thing is true with many other commodities or services. Costs may vary in different cities or in different sections of the country. Conditions in various places can cause a variance and still the charge may be fair and equitable. Consequently, it is not necessarily correct to say that the cost is too high in town B simply because it costs less in town A.

In several other "high cost" cases where re-wiring was required for a range installation, another condition was found. Many old homes which were originally wired twenty-five or thirty years ago, and which have been occupied continuously, with the occupant adding refrigeration, kitchen appliances, better lighting, electric blankets, radios, clocks and other current consuming devices without at any time increasing the wiring capacity in the home, have finally had an electric range added. Here is what happens in such cases. When the electrical contractor is called in to make an estimate on

(*Continued on page 82*)

The specific problems of residential

by Joseph T. Glotfelty
President, Globe Electric Co., Inc.
Takoma Park, Md.

To avoid any shadows on reading matter and at the same time avoid the reader's consciousness of the light source overhead, four 150-watt lights were put over the lounge in one of Mr. Glotfelty's remodeling jobs.

High intensity of controlled light was designed for this small area for a music-loving family. Recessed ceiling spots met the need.

◆ RESIDENTIAL LIGHTING involves a number of factors that contractors do not meet under commercial or industrial conditions. The primary question we ask ourselves in approaching the wiring of a custom-built home or remodeled residence is—to what purpose is this lighting being put? What function is it to have? What effect is the resident after?

When we have studied the purpose of each room and what we are trying to accomplish with lighting, we take into consideration room size and shape, colors of the room, articles of furniture in particular favor with the family, living habits and hobbies of the family members, and other aspects that may bear on how you plan to illuminate the home. Working with the family on lighting will disclose their preferences.

Choosing fluorescents

Because fluorescent lighting is relatively new in the home, and people are unfamiliar with its effects, the uses to which this lighting is put must be approached more cautiously. For example, cold white fluorescent lighting in a kitchen may tend to make bacon or coffee look gray, or may appear to distort brightly colored countertops from the original color scheme. Deluxe fluorescent lights in soft white may bring out the reds, yellows and browns of a room, whereas standard fluorescent will impart a dead look.

Noise level in a home is lower than in an office or store, and the fixture that has a vibration or hum is unsuited to a residence. Sensitive residents who expect rest and relaxation at home may find such a fixture disturbing. For good residential lighting, a contractor has to know his manufacturers and their products; he needs good ballast in lighting, or he may have to change ballast. He has to be aware

Two spots centered over each half of this bed accommodate bedtime readers.

of the many plastic reflectors and shades on the market that do not stand up under intense heat.

Know customer needs

The first recommendation I would make to a contractor wishing to do a more effective job in residential lighting is to acquaint himself with the customer's needs, in order to determine the degree of light intensity in an area. Is reading or music a part of daily living? A particular chair near a window may require highlighting because a good deal of time is spent in that chair; another member of the household may favor the piano and wish especially good illumination here that will blend in with over-all lighting. A favorite painting or a desk, at which a great deal of time is spent during the day, may require special lighting.

If there is a picture window, lighting will have to be studied for outside effect as well as inside, and for lack of glare. Careful study will determine whether a balanced lighting job has been accomplished. For controlled lighting such as may be wanted in highlighting a portrait, we have found the small adjustable fixture useful because it avoids a glare. We have used small swivel-type units in both standard and spot bulbs on built-in closets of drawers and dressing alcoves with good results.

Study room shape

The shape of the room is another consideration with regard to good lighting. A rectangular fixture may be out of place in a circular room unless special effect is being sought through contrast.

A round fixture generally gives a more even distribution of light whereas a square or rectangular fixture may have bright spots on the shade or glass. A room with a low ceiling requires a close-hung fixture. These are all details that will become apparent with experience.

If you are seeking high intensity of light in a small area, a uniform level of light may be obtained with slimline fluorescent fixtures that go all the way across the room. We used eight-foot slimline fixtures in a sewing room and in a child's playroom to give uniform level of light across the room with very good results. The customer was well pleased. Here we eliminated glare by using side panels and louvers on fixtures.

Cove lighting lends itself well to fluorescent lighting. In cove lighting it is necessary to go to remote ballast in order to keep fixture size down in coves. Where outline lighting is used, we have used metal molding and strip units to advantage.

Illustrative installations

We believe a few illustrations of jobs we have carried out in custom-built homes may serve to clarify what we attempted under certain conditions. In a living room where there was a large corner lounge with unique-shaped coffee table, we placed four 150-watt high hats above the lounge bringing the light to correct position for lighting without shadow or glare. We wanted to avoid any shadow on reading matter, and at the same time avoid a reader's consciousness of the light source overhead.

One requirement of a residential lighting scheme may involve highlighting a favorite picture.

We centered a 75-watt spot in a picture window but positioned it over a reading chair in an alcove, moving it back so that no glare would be created on the window sill.

Three nine-positioned master switches furnished three locations for remote control of each light in doorways to the kitchen and to two bedrooms. A recessed spot in the entrance of the foyer picked up control from a floor light. We placed 150-watt spots over the desk and piano to give controlled but high intensity light.

In a bedroom where we removed a center ceiling fixture, we re-

(*Continued on page* 80)

How an Alabama contractor pioneered

Contractor J. H. Landers, left, examines a 12-circuit switch installed in a new home for builder M. S. Lyle, center. Electrician Harold Hull skins a wire to connect junction box for thermostat in the utility room. Electric heating in the utility room will save valuable wall space for the washer and dryer.

◆ THE DAY, four years ago, when J. H. Landers, owner of Landers Electric Service, Decatur, Ala., quit electric appliance repairs to pioneer electric radiant heating in his territory, proved his big one from the standpoint of increased volume, profits, and prestige.

Since he started with the electric radiant heating line to supplement his residential, commercial and industrial wiring service, Mr. Landers has installed electric heating in over 600 new homes in Decatur and surrounding territory.

"The first few sales, with an unknown and untried system of heating were the only real tough ones," Mr. Landers explains, but after the first heating season the snowballing word-of-mouth promotion by satisfied customers set in and this has been the big factor in selling ever since."

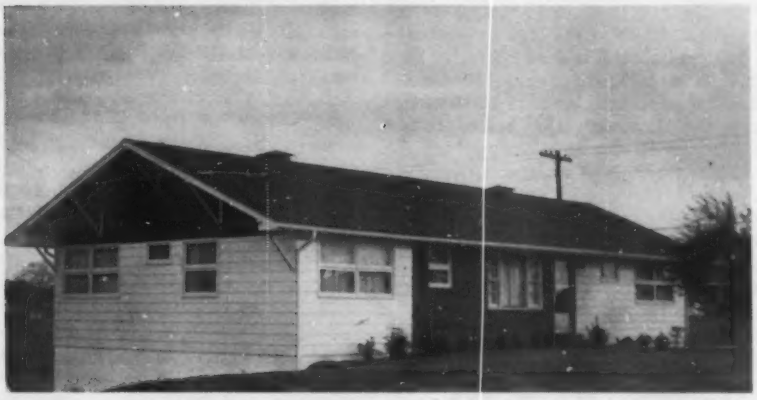
Self-selling system

One by one this alert contractor has convinced local building contractors and speculative builders to try a job with the new heating method. Once started, none has dropped it, and it is now used on most of the area's new houses. As a result of his pioneer work in electric radiant heating, backed by good installations, Mr. Landers has installed over 75 per cent of the electric heating jobs in his territory. Most of the jobs have been new residences where the electric cable is fastened to the ceilings and covered by plaster, but the line he handles includes cables for concrete, cables for drywalls, and cables for panels to be installed in homes and offices.

"I insist on three-fourths inch plaster over the ceiling cables," says Mr. Landers, "and where this has been done we have had no trouble from cracks in plaster. In-

electric radiant heating

by W. M. Massey



The two homes above are typical of the range of new houses in the Decatur area in which Mr. Landers has installed electric radiant heating. Homes with the new heating method have become so popular in the area that speculative builders are considering it a must for the quick moving of a new building on the market.

sulation overhead is six inches in most cases and two inches of mineral wool or equivalent is used in floors according to manufacturer's specifications. Doors and windows are weatherstripped and thoroughly caulked. Many home owners use insulation in walls but I have found that wall insulation in this territory is not always justified."

Stress of low cost

The average job, on five-room homes runs around $350 according to Mr. Landers but in the larger homes, some in the $25,000 class, the costs are two to three times as much. Operating costs in the smaller homes seldom exceed $30 per month in coldest weather and this includes all utilities as the homes are all-electric. Mr. Landers is satisfied that electric radiant heat users are heating their homes at less cost than they could with gas, oil or coal. He installs 12 to 16 circuits with separate circuits for heat to each room.

The advantages of selling and installing radiant electric heat from the viewpoint of the electric contractor, are listed by Mr. Landers as follows:

1. Installation is easy. When the lathe is ready and wiring is roughed in, the heating cables are simply stapled to ceiling with installation varying from three to four hours work. Then the job is ready for the plasterer.

2. It is practical and economical for homes in all price ranges and provides a broad market for new and old homes.

3. Once a few jobs are installed and contractors realize the advantages, radiant heat begins to sell itself, especially in areas of lower power rates.

4. There are no maintenance or repair problems. Manufacturer backs the system with a five-year guarantee. Out of the more than 600 jobs installed at Decatur the contractor has had to go back to fix a failure in only one case. This was due to plasterer cutting a cable.

5. The product is applicable to remodeling work, commercial and industrial jobs and farm uses such as brooders, kennels and soil heating.

Proved advantages

Outstanding advantages to the home owner and contractor-builder that bring satisfaction and help promote demand are briefly these, as tested at Decatur:

1. Operating costs are lower and more competitive.

2. The system is completely automatic and provides carefree operation.

3. Home owners have control over waste of heat by individual thermostats for each room.

4. Building maintenance is reduced due to cleanliness of heat. Papering, painting and other redecorating costs are cut to minimum.

5. Building costs can be reduced to help offset cost of the heating system by eliminating chimneys, flues and vents; even utility rooms can be eliminated.

6. Summer air conditioning for the home is more economical due

(*Continued on page* 78)

Automation through electronics

Part I

by Robert J. Wilson, Sales Engineer
Photoswitch, Inc., Cambridge, Mass.

This is the first in a series of articles outlining how automatic operation in industry can be achieved through the application of a few relatively simple pieces of electronic apparatus. Following articles in this series will describe specific applications in a variety of industrial plants.—Editor

◆ AUTOMATION is a word heard ever more frequently in industry today. With competition becoming ever keener, it is essential to produce a better product at a lower cost. Automation improves quality, increases output, permitting production of a better and more uniform product at a lower cost.

Formerly automation was associated with a large dollar sign. Neither machines nor controls were available for this type of operation. To produce a fully automatic machine involved a large expenditure of capital. Many companies did not have the personnel available within the company to attempt projects of this type. Therefore, outside help had to be utilized. This involved a long expensive job since everything had to be designed and built from scratch.

As engineers devoted more and more of their time and talent to industrial problems, controls began to appear that would make a standard machine semi-automatic. As further machine design progress was made, the machines were semi-automatic in design so that with the addition of an electronic control, they began to approach the fully automatic stage.

Package controls available

One major problem remained in that each control had to be individually tailored to fit the specific machine. This factor greatly limited the control applications by keeping the price high due to the low volume market. Then packaged control systems began to appear. These were very basic units that could be attached to almost any machine for simple applications.

The use of photoelectric principles was one of the first methods used in industry to solve its control problems electronically. Photoelectric controls have filled an important requirement in industry because they are very versatile, inexpensive, dependable, and easy to maintain. They have been broadly accepted as the answer to many industrial control problems.

The photoelectric effect is by no means a new discovery. It dates back a good many years to the accidental discovery that selenium is light sensitive. This opened up a whole new era in the development of electronic devices. Many of the electronic marvels that are common at home and in industry such as television, talking moving pictures, safety devices, automatic door operators, etc., are being enjoyed today because of the discovery of this photoelectric effect.

Simplicity of application

A photoelectric control is in reality one of the simplest control devices now in use. It may be compared to an ordinary "on-off" switch. The beam of light directed to the phototube is the handle of the switch. By interruption of this beam, the switch handle is effectively placed in the "off" position. By restoring the beam, the switch is returned to the "on" position.

Unlike the switch handle, however, no energy is consumed in operating the light beam. This fact permits photoelectric relays to be used on materials such as freshly painted surfaces where mechanical control would be impractical. The control requires no mechanical linkage to the machine and will operate independently. On the other hand, it may be used as an integral part of the machine and receive all its operating instructions from the machine itself.

There are many combinations of photoelectric controls now available to industry. The simplest and most widely used in the standard photoelectric unit with light source and receiver for "on-off" type of application. From this basic unit, a wide range of more complicated controls are available for all types of industrial applications: photoelectric time delay units, counting sets, smoke detectors and smoke indicators, intrusion alarms, general purpose long range controls, registration controls, level controls, pyrometer controls, turbidity controls, and surface differential inspectors or comparators.

Accessories extend usefulness

Many accessories are available for use with these units: such as, miniature and sub-miniature heads for mounting where space is limited; phototubes that may be remotely located from the control box permitting the control to be mounted in convenient out of the way locations or wired into master control panels; various sizes and types of light sources for standard and long range applications; light filters; light shields; light source adjustment, to vary the amount of light desired; reflection scanners, permitting light source and phototube to be housed in one unit; extended lens, to increase effective range; magnetic counters; all of which may be mounted and housed in standard, water-proof, and explosion-proof enclosures.

Obviously, the photoelectric control is a very versatile piece of equipment which can be applied to solve many industrial problems. When a control problem presents itself one should ask "Can it be done photoelectrically?" The answer will undoubtedly be "Yes." As Confucius say, "He who thinks photoelectrically will see the light."

Photoelectric control has been applied extensively to conveyor lines for sorting, counting, and special processing such as heat

treating, freezing, etc. Because such conveying lines are used in many different types of industry, this type of application offers one of the best opportunities for the industrial electrical contractor to get established in this field. Some typical conveyor line applications are described in the following paragraphs.

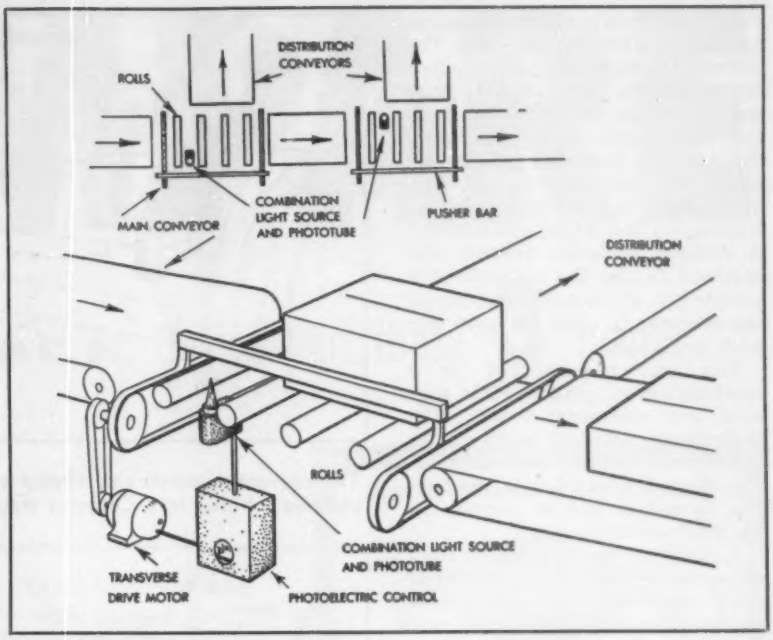
Sorting of cartons

In a glassware manufacturing plant, a main conveyor carries cartons of three types of glassware from the manufacturing area to the warehouse. Once in the warehouse, each type of ware must be sorted and sent to its own storage area. Since the cartons containing any one type of ware differ widely in all dimensions, it is not feasible to sort by size and shape. Before an automatic sorting system was devised, two men were in constant attendance to push cartons from the main conveyor onto the proper distribution conveyors.

Two photoelectric controls solved the problem of automatic sorting. One is located at the right-hand side of the conveyor at the first discharge point in the warehouse. The other is at the left-hand side of the conveyor at the second discharge point.

The actuating device for the scanners is a small strip of reflecting tape put on by the packer when he assembles a carton. For one type of ware this strip is located along one edge of the carton bottom and extends almost to the middle of the carton. For the second type of ware the strip is located along the same edge of the carton bottom, but from the middle to the opposite side of the carton. No tape is used for cartons carrying the third type of ware. The cartons are placed on the conveyors so that the tape is at right angles to the direction of carton travel. The tape on one type of ware is at one side of the conveyor. The tape on the second type of ware is at the opposite side of the conveyor.

The scanners "look" at the carton bottoms between the conveyor rollers at each discharging point. One scanner located at one edge of the conveyor "sees" only one tape location. The other scanner is located at the opposite edge and "sees" only the other tape location. Making observation at the bottoms of the cartons insures correct focus because all tapes are at a fixed distance from the scanners.



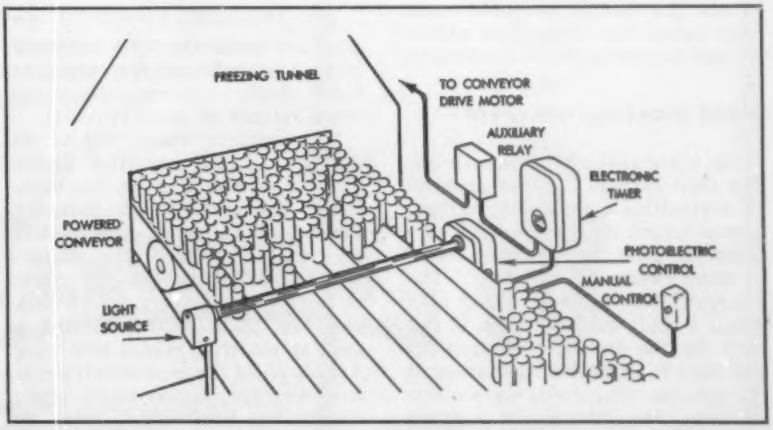
Two relatively simple photoelectric controls solved the problem of sorting cartons automatically. Reflecting tape on bottom actuates control.

Upon "seeing" a reflecting tape pass, the photoelectric control operates a pusher bar mechanism which removes the carton from the main conveyor onto the proper distribution conveyor. Cartons without a reflecting tape pass right by the first two distribution conveyors to the third storage area.

This new sorting system has resulted in increased efficiency, sorting speed, and accuracy in warehousing of various types of glassware. At the same time, warehouse labor cost has been greatly reduced.

Control in quick freezing

A wide metal conveyor belt moves small citrus concentrate cans through a freezing tunnel for quick freezing. As the cans pass through the tunnel, a freezing draft is forced downward in large



As cans are carried through quick freeze tunnel, photoelectric equipment stands guard that conveyor is well filled and contains no wide gaps which would result in uneven freezing of products or even insufficient freezing.

volume to "quick freeze" the citrus concentrate within the cans. The conveyor is normally packed solidly with cans, and should large spaces appear between the cans, the down-draft of air is forced through the conveyor itself and passes by the cans too quickly. This results in poor or insufficient freezing of the citrus concentrate. A reliable, accurate control was required to stop the conveyor if a sizable gap appeared, and to signal the operator to refill the open gap with more cans.

This was accomplished by a combination of photoelectric controls and electronic timers. The photoelectric control beam shines horizontally across the conveyor. The timer is wired for delayed action operation and is started by the photoelectric control.

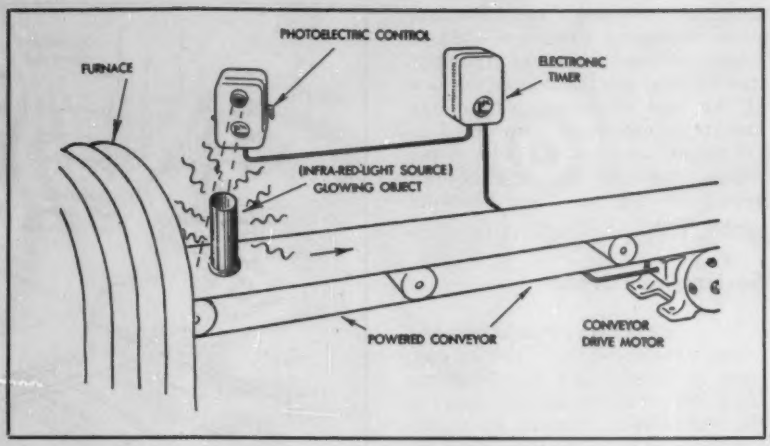
A push button is used to start the conveyor and by-pass the timer relay until the conveyor moves the cans into the photoelectric control beam. The operator releases the push button and the conveyor continues to move the cans as long as the control beam is interrupted. If a gap appears, the photoelectric control beam is established across the conveyor. The photoelectric relay drops out and starts the timing cycle of the electronic timer. If the gap length exceeds the pre-set delay interval on the electronic timer, the timer relay drops out, shuts off the conveyor and rings an alarm. The conveyor starts, the alarm stops and the timer resets — all automatically — when the gap is filled with cans and the light beam is again broken.

If the gap length is shorter than the timed interval, cans coming along the conveyor break the beam and the photoelectric relay closes before the timing interval ends. This resets the timer, and allows uninterrupted conveyor movement.

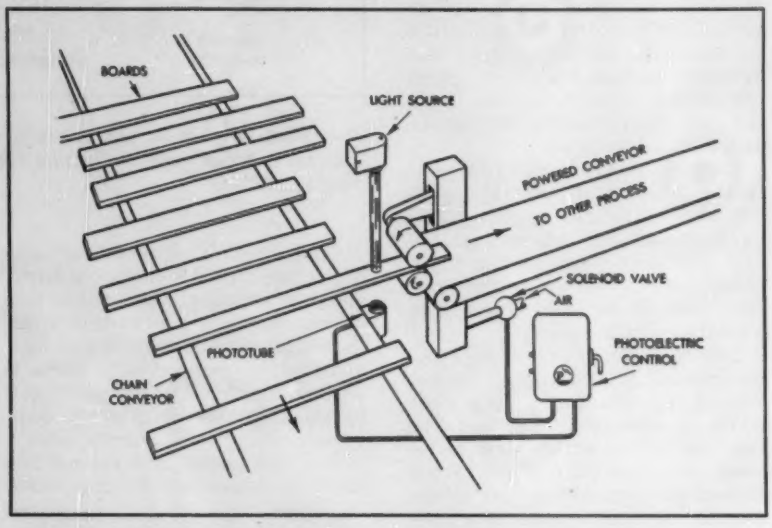
Heat treating conveyor

An armament plant manufacturing shell casings had the problem of controlling a conveyor carrying newly forged shells, which emerge from the heat treating furnace at a temperature of 2300° F. The conveyor was to be operated only when a shell was placed on it and only for the distance required for the shell to reach the next stage of the process. The shells were ejected from the furnace at varying rates, which precluded the use of a timer alone. Mechanical limit switches contacting the shell emerging from the furnace were tried for controlling the conveyor, but contact with the high temperature shells caused abnormally rapid failure of these switches.

The problem was solved by the use of a highly sensitive photoelectric control and an electronic timer. The photoelectric control is located where it can view the exit door of the furnace. The glowing white hot shell is an intense source of infra-red radiation, which actuates the photoelectric control as soon as the shell comes into view. At this point the photoelectric control operates the conveyor which carries the shell away from the furnace. At the same time it starts the electronic timer, which keeps the conveyor running for the precise length of time required to position the shell for the next operation.



This conveyor operates only when a hot shell case emerges from the furnace, utilizing infrared rays. Conveyor moves case to next position.



Inspector pushes quality boards a foot out of line on conveyor. Photoelectric control operates mechanism which moves these to other process.

Lumber selector system

A lumber mill uses an inspector to spot selected quality boards as they pass by on a conveyor. He pushes these boards approximately a foot out of line across the conveyor. Before photoelectric controls were installed, the selected boards would then engage a tripping mechanism which pulled them off this conveyor line at right angles onto a second conveyor, on which they proceed to a planer or another processing machine. However, the tripping mechanism re-

(*Continued on page* 80)

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Code discussion occupies Southern Section, IAEI

◆ NEARLY three hundred members and guests of the Southern Section, International Association of Electrical Inspectors, gathered in Tampa, Fla., October 25-27, for their annual meeting. The National Electrical Code formed the principal topic of discussion with several sessions devoted to a better understanding of the application of the Code.

The program also included sessions for the reports of Code Committees and discussion of proposed changes. This portion of the meeting enables members to take an active part in formulating revisions and additions to the National Electrical Code.

Current problems

In the session for Code Committee reports, International Secretary Charles L. Smith presented three problems to the group and asked for an opinion vote by a show of hands.

First, it has been recommended that new marking be used on wires and cables to take the place of the present solid color method. Sam Rosch stated that it was suggested that a colored stripe be used as a marking. It was generally agreed by a show of hands that something better than a single stripe be provided.

Second, Mr. Smith told of a new product known as "Flexicore." He stated that the new material has been submitted to the Underwriters' Laboratories, Inc. for a fact-finding report.

It was the opinion of those present that the Section should wait until a fact-finding report is available from Underwriters' Laboratories, Inc., before making any comments.

Third, Mr. Smith wanted an opinion from the group if they were in favor of interchangeability of moulded case circuit breakers. It was unanimously voted that they were not in favor of interchangeability as this may lead to the overloading of conductors.

Newly elected officers of the Southern Section, IAEI, include the following:

President: R. B. Boyd, Jr., Raleigh, N. C.

1st Vice-President: J. C. Steele, San Angelo, Texas.

2nd Vice-President: R. L. Crawford, Augusta, Ga.

Secretary-Treasurer: A. M. Miller, Richmond, Va.

Asst. Sec.-Treas.: J. C. Young, New Orleans, La.

Chaplain: D. S. Nichols, Raleigh, N. C.

Members of the Executive Committee for the new administrative year: R. E. Ward, chairman, Nashville, Tenn.; E. L. Brendel, Roanoke, Va.; C. G. Butler, Decatur, Ga.; W. A. Cochran, Jr., Birmingham, Ala.; L. W. S. Cosens, Sr., Miami, Fla.; J. W. Dunning, Columbia, S. C.; G. G. Griffin, Houston, Texas; C. R. Kennedy, Greensboro, N. C.; O. C. Smith, Laurel, Miss.; and S. W. Thomas, Shreveport, La.

Representatives elected to the IAEI Executive Council are: (1) Dewey L. Johnson, Atlanta; Alternate, R. E. Ward, Nashville, Tenn. (2) N. E. Cannady, Raleigh, N. C.; Alternate, M. D. Darrah, Dallas, Texas. (Ex-Officio) A. M. Miller, Richmond, Va.

Gus Miller then read several proposals of code changes as recommended by the Virginia Chapter. They were in reference to Sections 2216, 2201, 2203 C-1, 2203-d, 2304-a and 2203-e.

It was recommended that these proposed changes be sent to Mr. Cogan at the International office who will see that they are brought to the attention of the proper committees for study.

Dewey Johnson made a motion that the Southern Section go on record as being in favor of deleting fine print note following Section 2352. The motion passed.

R. E. Ward reported for Panel 5 and his panel recommended that the following be added to section 2542-c: "In other than residential occupancies." A motion was made, seconded, and passed that grounding be done in all cases (residential or otherwise).

B. Z. Segall served as moderator for the first code discussion period. The panel of experts included: M. M. Brandon, Underwriters' Laboratories, Inc., H. M. Dreher, National Electric Manufacturers Assn., Donald B. Mills, Underwriters' Laboratories, Inc., Eustace C. Soares, Consulting Engineer, Chas. L. Smith, Sec.-Treas. I.A.E.I., H. H. Watson, General Electric Co., Joseph Whitner, S. E. Underwriters Assn.

Code discussion

The first question to come before the panel was, "Can three-way switches be used in operating room?" This brought on considerable discussion and difference of opinion among members of the panel.

Mr. Brandon said no, as Section 5135-f-1 states that the switch must disconnect each circuit conductor.

Someone on the panel stated that it would be acceptable if a double pole switch was ahead of the three way switch. Mr. Smith said no, because it did not conform to the electrical section of the hospital operating room pamphlet No. 56.

Mr. Watson said no, because a three-way switch was not an indicating switch showing "On" or "Off" positions.

Mr. Smith stated that Sections 5-8 of the hospital operating room pamphlet No. 58 should take care of this situation. He further stated if the three-way switches could comply with these requirements then they would be acceptable.

The second question was, "What type of wiring would be required in locations using turpentine?" It was agreed that turpentine used at normal temperatures did not present any particular hazard and therefore any recognized wiring system would be acceptable.

Someone wanted to know if waterpipe could be used to enclose service conductors. The answer was no, waterpipe is not acceptable to enclose any type conductors.

The next question was, "When fluorescent fixtures are mounted end to end, what kind of insulation would be required for the circuit conductors?"

Someone on the panel read Section 4143 which was very clear and to the point. The panel agreed.

The Tuesday morning session began by the presentation of a Scroll to past member Ellis Knox. Dewey Johnson made the presentation and expressed many kind and sincere remarks about Mr. Knox. He spoke of the fine work Mr. Knox had done on the Electrical Committee, Executive Council, I.A.E.I., Conference of Mayor, I.B.E.W., and many other committees. Mr. Knox stated that he was very proud to be one of us and stated that the electrical inspectors and their codes and standards are far ahead of other trades groups.

The Code panel was asked to take a seat at the head of the table, with B. Z. Segall acting as moderator.

The first code problem was, "What are requirements for 115 volt grounding, and polarization at receptacles?"

Mr. Watson stated that many of the 1953 code grounding rules were the result of a committee headed by Chairman Schirmer.

It was the general opinion of the panel that grounding is not required in residences except for the outlet at the laundry machine location. In other than residences, frames of electrical equipment shall be grounded if in reach from

(*Continued on page 79*)

Official Code interpretations explain controversial points

◆ A SERIES of four official interpretations of the 1953 National Electrical Code have been released by the National Fire Protection Association, it was announced by Charles L. Smith, electrical field engineer of the NFPA and secretary of the National Electrical Code Committee. These interpretations are in addition to the official interpretations of the 1953 Code previously released and published by the NFPA in the 1954 edition of the National Fire Codes, Vol. V, Electrical.

These interpretations, developed through the established committee procedure in response to requests, have been reviewed and released by the NFPA Electrical Correlating Committee. Subjects covered include disconnecting means and protective devices for motors, conduit installation, and combustibility of wall and ceiling finish around electrical fixtures. The full official texts of the interpretations follow:

Interpretation No. 404

Section 4402 and 4328; protective devices for motors.

Statement: — A hermetically sealed condensing unit, utilizing a two horsepower motor is protected by a single pole inherent overheating protective device. The motor and protective device have been tested as a unit and found acceptable. The unit is controlled by a double pole pressure switch suitable for the application. The supply is 230 volt, single phase through a double pole, double fused, 60 ampere, 230 volt enclosed switch. The switch is within sight of the unit and not more than ten feet from it.

Question No. 1—May this switch be used as a disconnecting means as required by Section 4402?

Answer—Yes.

Question No. 2 — Does Section 4328 prohibit the use of a single pole inherent overheating protective device as the motor running protection?

Answer—No.

Interpretation No. 405

Section 3464; conduit installation.

Question—Does Section 3464 of the National Electrical Code require the treatment of conduit threads with paint or other material in order to assure water tightness?

Answer—No.

Interpretation No. 406

Sections 4409 and 4402; disconnecting means for motors.

Statement: A motor exceeding 50 horsepower, supplied by an individual branch circuit is fed through a circuit breaker installed in a panelboard capable of being locked. The motor controller is located within sight of the motor. The control circuit of the controller is connected in series with a push button switch located adjacent to the motor. When the stop button of this push button switch is operated, it opens the circuit to the motor controller.

Question No. 1—May the circuit breaker in the lock-type cabinet be accepted as the disconnecting means and satisfy the provisions of Section 4409?

Answer—No.

Question No. 2—May the push button control switch, which can place the controller in an open position, be considered as the disconnecting means required by Section 4402?

Answer—No.

Interpretation No. 407

Section 4124; combustibility of wall and ceiling finish.

Statement: Section 4124 of the 1953 Code requires that any combustible wall or ceiling finish exposed between the edge of a ceiling fixture or pan and an outlet box be covered with noncombustible material.

Question No. 1—To what extent must the material be combustible to fall within the intent of this section?

Answer — Combustible in the sense used in this section was intended to apply to materials such as wood, wall paper, burlap, and other combustible cloths and plastic fabrics, combustible wall board, and the like to the extent that ignition could be started by an arc or the high temperature of a defective connection. The inspection authority would be expected to make the final determination.

Question No. 2—To what extent would a material have to be noncombustible to fall within the intent of non-combustible as used within this section?

Answer — Non-combustible was intended to apply to materials that would not normally support combustion nor convey flame, such as asbestos, plaster and most metals.

Fluorescent street lighting for shopping centers

◆ A HIGHLY SUCCESSFUL EXPERIMENT with exterior fluorescent lighting for a shopping village has recently been completed in the Highland Park Shopping Village in Highland Park, Texas, which is a community completely surrounded by Dallas.

In this case, fluorescent lighting for streets, parking areas and store fronts was obtained through the use of 30-feet-high standards and results are so pleasing as to be beyond comparison, according to Hugh Prather, Jr., of the firm of Flippen and Prather, owners of the shopping village.

Modernizing project

"It gives a very satisfactory modern touch to the village," said Mr. Prather. "We practically had no lighting at all before by comparison. It is like comparing a Model T with the modern version of an automobile."

The 30-foot standards were placed 163 feet apart. Each standard supports two G.E. 206 fluorescent luminaires with 21,000 lumens each or 42,000 lumens per standard.

The project was designed by Travis Winters, assistant commercial manager of the Dallas Power and Light Company, whose hobby is street lighting. Winters reports he laid out a design for both fluorescent and mercury, but recommended fluorescent because many elderly people patronize the village and might not be pleased with the results of mercury facial lighting.

"The net result is evenly distributed light with no glare or spots," Mr. Winters commented.

The assistant commercial manager has pressed his hobby to the extent that on an experimental basis he has sold the City of Dallas one block of fluorescent street lighting in the downtown retail area.

The Highland Park contract was handled by Ed Roos, Roos Electric Company, a tenant of the shopping village. Also assisting in the project was Mark Elliston of the Dallas Graybar branch.

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Raise revenue and reduce complaints with

Regulators on rural lines

by A. G. Bale, Jr.
Development Engineer
Line Material Co.

◆ IMPROVED SERVICE, increased revenue, and better customer relations are the advantages afforded by the application of regulators to rural lines.

Because voltage is a major factor in the design of an electrical appliance, an operating voltage that falls within the design range of the appliance will produce the best performance. A customer satisfied with the performance of his electrical appliances will expand his use of both appliances and power. To obtain this greater usage of power and increased revenue, it is important to know what a satisfactory operating voltage is and how pole type feeder voltage regulators can be applied to achieve this end.

What can be considered satisfactory voltage is basically dictated by the characteristics of customer appliances and equipment. Nearly all of the more modern appliances and equipment are designed for best performance when operating in the "favorable zone" of voltage. This zone is defined in the EEI-NEMA report "Preferred Voltage Ratings for A-C Systems and Equipment" as 110 to 125 volts. It is the voltage that should exist at the point of utilization after transformer drop, secondary drop, and customer wiring drop have been taken into account.

But because rural systems generally consist of long lines where a relatively high primary voltage drop must be accepted, it may be necessary to permit utilization voltage to reach into the lower part of the "tolerable zone" of 107 to 127 volts. Such a condition should occasionally be necessary only at the more remote points of the system.

Benefits to be derived

Probably the best known benefit to be realized from satisfactory voltage is the greater revenue obtained from incandescent lighting loads. The curve in Figure 1 shows this important relationship of the incandescent lighting revenue to voltage. Also shown are the losses of revenue out of each dollar of possible revenue that would exist at the indicated values of undervoltage. With incandescent load generally running between 30 and 50% of total load, the additional revenue rightfully due the

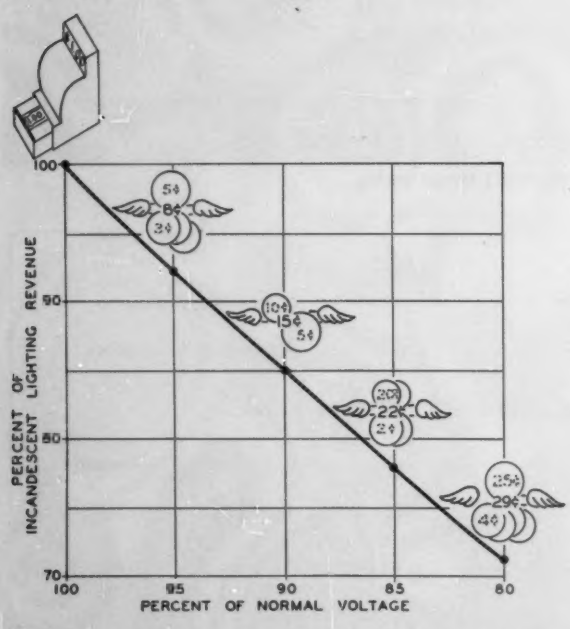

Fig. 1. From the utility company's viewpoint, low voltage and lost revenue are synonymous. This chart shows graphically how lighting revenue drops with voltage.

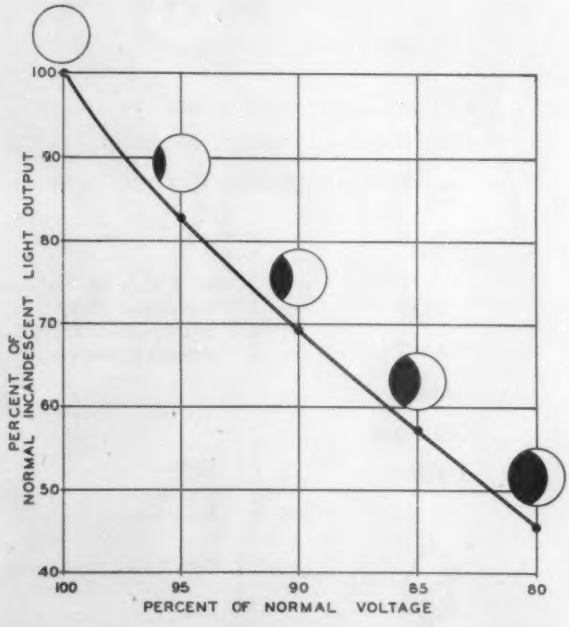

Fig. 2. Because the light output of an incandescent lamp drops off more rapidly with reduced voltage than does energy consumed, the customer loses, too.

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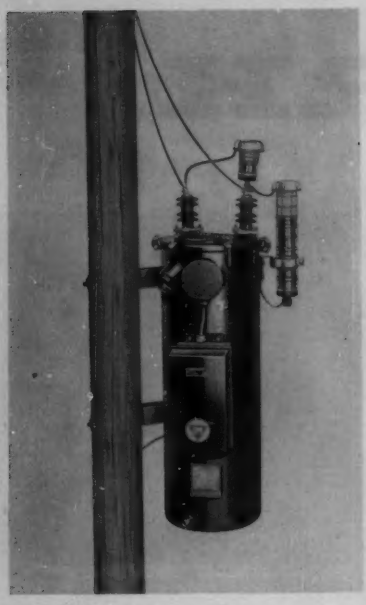


Fig. 3. A typical pole-mounted, feeder voltage regulator, especially suited to rural line application.

Fig. 4. Regulator control contains a rugged contact-making voltmeter, selector switch for manual control, electrically actuated operation counter, control power switch, and "seal in" and arc-suppression circuits.

operating company can be substantial.

Furthermore, a customer receives the best relationship between illumination, power consumption, and life when an incandescent lamp is working at or near its rated voltage. In Figure 2 the relationship between light output and voltage pictures the immense loss of light that a customer will experience at low voltage. It can be seen from this curve that there is a 31% loss of light at 90% voltage and a 55% loss of light at 80% voltage. In other words, a 100-watt lamp at 80% voltage is less than the equivalent of a 50-watt lamp at rated voltage.

With low voltage, the customer does not pay as much for the use of a particular electric lamp, but he still gets the short end of the bargain. At 90% voltage and 69% light (Figure 2), he uses 85% of rated wattage. At 80% voltage and 45% light, he uses 71% wattage. Therefore, if he pays $1.00 for 100 units of light at rated voltage, he pays $1.23 at 90% voltage and $1.58 at 80% voltage for the same 100 units. Thus the operating company suffers the loss of revenue, and the customer the loss of light.

Rated voltage advantages

When heating appliances operate at rated voltage, they function more quickly and more effectively. Motors will operate more efficiently and with less overheating trouble. Television receivers have brighter and more satisfactory pictures when operating at or near rated voltage.

Of great importance also is the fact that satisfactory voltage generally promotes better customer relations. With good voltage, a customer finds that the operation of electric appliances is more satisfactory and reliable. Because of the greater convenience, he is inclined to purchase more appliances, and thus he consumes more energy.

Low voltage complaints

Most of the lower cost television receivers are particularly sensitive to voltage. Low voltage generally results in a reduced picture size, a weak picture, and on occasion causes the complete loss of a picture. If the customer has low voltage trouble and learns of the fact, he will be inclined to blame all of his television problems on low voltage, even after the undesirable condition may have been corrected. The operating company can become plagued by television complaints, only a small portion of which will have been due to his system conditions.

Low voltage causes sluggish operation of heating devices that would be particularly noticeable by housewives in the performance of electric ranges. There will also be complaints of heavily loaded motors that may fail to start or that may heat excessively. When a motor on an unsupervised automatic device such as refrigeration equipment fails to start, the result is often a burned out motor.

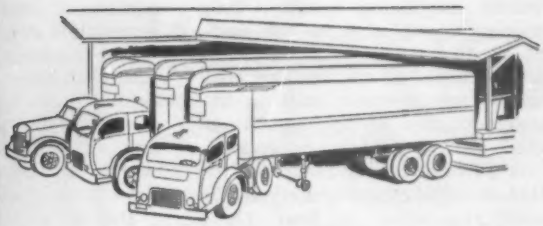
Another domestic complaint that has come into prominence concerns the failure of fluorescent lighting to start when a low voltage condition exists. The advent of the quick-starting fluorescent lamp may bring about much greater domestic use of fluorescent lighting causing it to become an even more important consideration.

Voltage correction

One excellent means of increasing revenue and reducing complaints through voltage regulation is with the use of regulators such as that pictured in Figure 3. To fill the requirements for rural regulation, such a regulator must be:

1. Low enough in cost to permit use of individual feeder regulation economically.
2. Maintenance free to keep cost of upkeep to an absolute minimum.
3. Stable and reliable from the control standpoint so as to require only infrequent routine inspection.
4. Easily installed in the area where low voltage exists.
5. Constructed to meet ASA and

Roy Fruehauf, President, Fruehauf Trailer Company



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says Mr. Fruehauf. "Frequently I find facts and ideas in business publications that help me to make important decisions. We know our customers and prospective customers read *their* business magazines, too. We carry substantial advertising schedules in several different groups of business periodicals."

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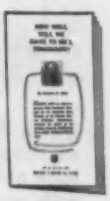

NEMA standards so that resistance of regulator to lightning and faults is equal to or better than other equipment on the circuit.

This list is by no means complete, but it does include several principal necessities.

The regulator pictured has been designed to meet all of these requirements. Particular emphasis was placed on simplified design without sacrificing quality, thus effecting lower cost to the purchaser. The design was based on surveys taken of the various customers' requirements and on intensive studies of line conditions noted during field investigations.

As a result, a regulator with a total of 10% of completely automatic regulation in four 2½% steps has been made available in 15 and 25 ampere sizes. The 10% regulation may be divided into any portion of buck and boost in 2½% increments. Voltage ratings available are for 6900/11950-, 7200/12470-, 7620/13200-, and 7960/13800-volt multi-grounded neutral wye systems. The 10% regulation is the equivalent of 12 volts regulation on a 120-volt secondary.

The regulator control, shown in Figure 4, provides the stability and trouble-free service to be expected from such devices.

Application of regulators

To take full advantage of the capacity of a pole-mounted regulator, a study should be made of the portion of the system on which installation is proposed. The study itself is normally not very difficult, and failure to expend this slight additional effort often results in a misapplied regulator. When a regulator is misapplied, either end-of-line customers or customers connected just before the regulator can still have unsatisfactory voltage at peak load, and the full worth of the regulator will not have been gained.

Before a study is made, the substation transformers and regulators should be adjusted for optimum output. In the case of substation regulators, full value should be realized by adjusting the output at peak load to provide the maximum permissible voltage at the first customer. This adjustment should be such that satisfactory light load voltage will also be provided.

If no station regulator is used, the taps of the substation transformer should then be set to provide the first customer with light load voltage as near the maximum permissible voltage as possible.

To make the voltage study of the portion of the system on which poor voltage is being experienced, peak load voltages must be checked at a number of points along the lines involved. These measurements must be plotted against the distance of the measurement from the substation.

A curve, or voltage profile, will be developed such as that represented by the light lines on Figure 5. The lettering on this profile indicates points at which voltage readings were taken. The voltages represented on the profile must be primary voltages. They do not and should not include additional customer transformer and secondary drop.

Future peak estimate

Once present load voltage conditions have been determined and plotted, an estimate of future peak load conditions for this same section of the system must be determined. This is simply a matter of estimating the increase in current that will take place in the next four or five years at the approxi-

(*Continued on page 78*)

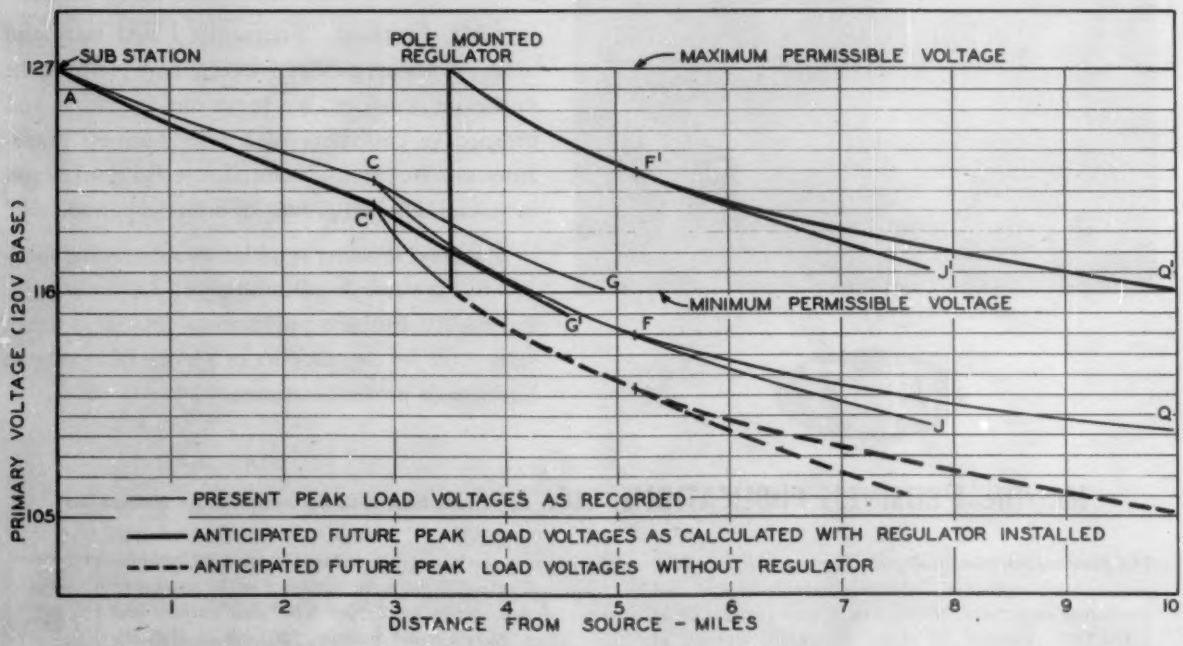

Fig. 5. System voltage profile. Light lines indicate present peak load voltages as recorded, and heavy lines show anticipated future peak load voltages as calculated with regulator installed. Broken lines show anticipated future peak load voltages without regulators. Voltages do not include additional customer transformer and secondary drop. Voltages represented on the profile must be primary voltages.

gates lighted with "WET" wire

Fifty feet of water behind this head wall furnish almost two million gallons per minute to make 13,800 volts of hydroelectric power. Flow is controlled by two 20-ton penstock gates which are operated by a remote-control gantry crane.

Head wall lighting wire, providing current to illuminate this vital operation, has to withstand condensation in conduits without sacrificing size, weight, or flexibility. Simplex-ANHYDROPRENE Wire with Anhydrex insulation and a thin neoprene jacket was purchased because it was considered best qualified to meet these conditions.

Anhydrex water-resistant rubber insulation gives excellent moisture protection. Anhydrex eliminates lead sheaths. ANHYDROPRENE is more flexible because of its small size and light weight. A thin neoprene jacket provides protection against abrasion, flame, oil, sunlight, and mildew.

Whether it is used for plant wiring, remote control, underground primaries or just plain lighting, ANHYDROPRENE offers dependable service and long life. More detailed information is contained in Bulletin No. 115. Write to the address below for a copy.

Simplex-ANHYDROPRENE

. . . ANHYDREX INSULATED WATER-RESISTANT LIGHTING WIRE

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

News of the industry

edited for Southern readers

Florida contractors hold annual convention

THE "LOOP" SYSTEM, a revolutionary new house wiring method, was illustrated and discussed as a highlight of one of the sessions of the three-day annual convention of the Florida Association of Electrical Contractors which met recently at the Orange Court Hotel in Orlando. The "loop" system report was given by Carl Boester, housing research consultant of Purdue University Foundation, Lafayette, Ind.

Mr. Boester reported that two years of field and laboratory research went into the three-wire loop system, which was developed by the Purdue Foundation at the request of *House and Home* magazine to find a better method to meet the rapidly increasing demands of electricity in the home. The finished system, according to the speaker, has four advantages over the old two-wire system. The encirclement of the house at the base plug height saves man hours, adaptability permits 240 volts throughout the house and keeps loads in reasonable balance. Greater safety is provided with the individual fuse at the outlets and capacity (wattage served at an equal volt drop) is substantially increased.

The increase in appliances, air conditioning and heating units in the home make it necessary for the electrical contractor to develop adequate wiring at the same or lower costs to meet electricity demands, Mr. Boester said.

Nearly 500 members of the association and their wives attended the convention, at which the Electrical Contractors Association of Central Florida served as hosts. This total was an increase of more than 100 over last year's attendance, according to Axel O. Ornberg of Curry Electric Co., Orlando, new president of the Florida group. Mr. Ornberg succeeds Vince L. Burkhardt of Arrow Electric Co., West Palm Beach.

Other speakers included J. Arthur Turner, Tampa; Howard Palmer, Orlando; James Dandelake, Jacksonville; H. A. Lilly and Laird Legg, Orlando; L. L. Dick, state manager of the electrical contractors association; W. T. Stuart, editor of *Electrical Construction and Maintenance*, and B. C. Cooper, eastern editor of the same magazine.

Conducting a joint panel discussion, the two editors said that the building picture in the U. S. this year is one of the brightest in the history of the nation. They declined to call Florida's building increase a "boom," and said that it was a natural outgrowth of population increases and other factors. Mr. Stuart said that the nation's electrical work showed a gain nationally of about ten per cent in volume, indicating it would double in ten years. He explained that the increased use of new appliances, which calls for heavier wiring, plus the increase in construction were responsible for the gain.

Mr. Stuart also stated that the Southeast generally seems to be developing faster than the rest of the country.

One of the highlights of the meeting was a tour of the Orlando Utilities plant, and some 34 manufacturers exhibited their products at the sessions.

Other officers elected to serve the association for the coming year are: Howard Palmer, Palmer Electric Co., Orlando, vice-president; R. H. Palmer, Jr., Lake Worth, second vice-president; and Howard A. Lilly, Tampa, secretary-treasurer.

The association crowned Miss Gail Cartwright of Winter Park as the convention queen. She will reign as "Miss High Voltage" for next year.

New officers of the Florida Association of Electrical Contractors elected at the recent annual convention in Orlando include, left to right, Vince L. Burkhardt, West Palm Beach, immediate past president; R. H. Palmer, Jr., Lake Worth, second vice-president; Howard Palmer, Orlando, first vice-president; Axel O. Ornberg, president; and L. L. Dick, Tampa, association manager.

250 attend AIEE Raleigh meeting

AROUND 250 PERSONS attended the annual Fall meeting of the American Institute of Electrical Engineers at Raleigh, N. C., recently.

Speakers and their topics included: A. S. Griswold, assistant to the president of the Detroit Edison Co., "The Next Decade in Power;" W. R. Harris, manager of the Industrial Engineering Dept., Westinghouse Electric Corp., East Pittsburgh, Pa., "The Next Decade in Power Utilization Equipment in the Industry;" Louis T. Rader, general manager, Specialty Control Dept., General Electric Co., Schnectady, N. Y., "Automatic Controls for Industrial Processes;" and C. E. Schooley, chief engineer, Southern Bell Telephone and Telegraph Co., Atlanta, Ga., "The Next Decade in Communications."

Two Duke University engineering seniors, Charles E. Seagar and Edward V. Stephenson delivered

another outstanding FA installation

NEW YMCA BUILDING AT TULSA, OKLAHOMA

Reg E. Taylor, Houston, Tex., Engineer, and West Electrical Const. Co., Tulsa, Electrical Contractors. Leon B. Senter, Tulsa, Architect.

The new and modern YMCA building in Tulsa, Okla., is the latest addition to the growing list of new and modernized buildings — commercial, industrial, institutional and residential — equipped with FA products for the control and distribution of power and light.

Like so many others, officials of the Tulsa "Y" learned, after careful study, that FA products were safe, dependable, long-lasting and trouble-free, and that they not only provide for present-day power needs, but allow for future expansion.

The next time you have a job involving power and light control, and distribution, recommend FA products. You'll find that it pays.

For further information, consult our catalog in Sweet's or your nearest FA representative.

FA Switchboard installed in new Tulsa "Y". The complete line of FA switchboards includes:
FA SHUTLBRAK — 30 to 1200 amps., 250 volts AC or DC and 600 volts AC 2, 3 and 4 poles. Rotary type operating handles furnished on 30 to 200 amp. capacities. Straight handles on all others.
FA KLAMPSWITCHFUZ AND SNUFARC — Klampswitchfuz capacities 30 to 600 amps., 250 volts AC or DC, 2, 3 and 4 poles, single or double throw. Snufarc 30 to 200 amps., 600 volts AC 2, 3 and 4 poles.
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makers of:
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service equipment • safety switches
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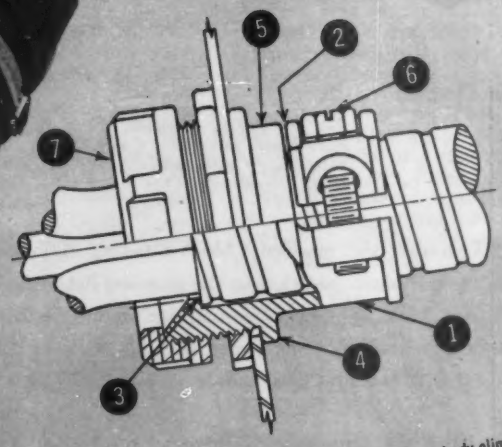
from every angle–

O.Z. TYPE "PK" is the clamp



1. Cadmium-plated malleable iron body and clamping cap for strength and corrosion resistance.
2. Armor clamped several turns from end.
3. Smooth armor stop assures termination at proper point—protects cable insulation from sharp, rough edges.
4. Flange on body eliminates locknut outside of cabinet.
5. Large hex facilitates installation.
6. Slotted hex-head clamping bolts can be tightened by wrench or screwdriver.
7. Strong O.Z. Type A hi-impact phenolic insulating bushing.

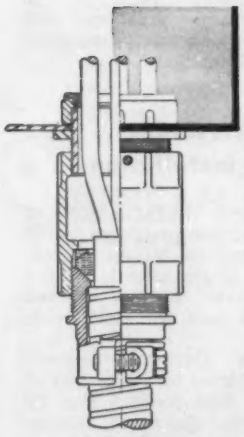
Here is a clamp designed specifically to meet the requirements of interlocked armor cable applications. The O.Z. Type "PK" Clamp provides exceptional speed and ease of installation, whether your cable enters the cabinet from the top, bottom or side. It is designed with ample thread length for use with all standard conduit fittings and terminators from 1" to 5" and is available for interlocked armor cable ranging in size from .99" to 4.38" O.D.

Call your local O.Z. Distributor.

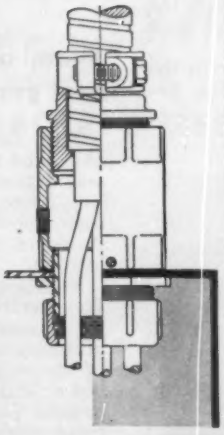
for ARMORED CABLE

combines with standard O.Z. fittings for any terminating or splicing job involving INTERLOCKED ARMOR CABLE.

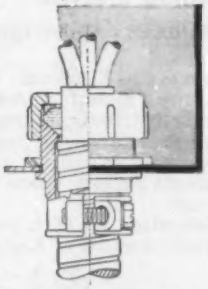
Seals cable ends to protect insulation against moisture and other contaminators—can also be used with threaded hubs and bosses to provide watertight cable entrances.



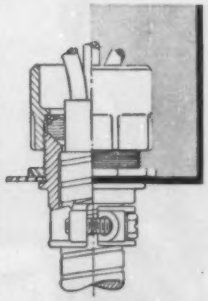
TYPE "PKC"
Terminator for interlocked armor cable entering bottom of cabinet.



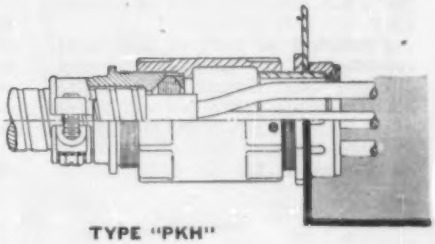
TYPE "PKT"
Terminator for interlocked armor cable entering top of cabinet.



TYPE "PKG"
Sealing bushing for interlocked armor cable entering a cabinet.



TYPE "PKF"
Compound bushing for interlocked armor cable entering bottom of cabinet.



TYPE "PKH"
Terminator for interlocked armor cable entering side of cabinet.

TYPE "PKS-J"
Splicing chamber for interlocked armor cable.

O.Z. ELECTRICAL MANUFACTURING CO., INC.
262 BOND STREET • BROOKLYN 17, N. Y.

CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

a paper on "Fluid Mapping of Electric and Magnetic Fields."

The address of welcome was by Dean J. Harold Lampe of the N. C. State College School of Engineering, where the sessions were held.

Over 60,000 visit Kansas City P&L home

KANSAS CITY POWER & Light Company has closed the all-electric home which it constructed and opened to the public the middle of last March. A total of 61,975 persons visited the home during the 20 weeks exhibition period.

Harry B. Munsell, president, who conceived the idea of designing and building the house in one of Kansas City's new residential areas, presented a complete all-electric kitchen to the young couple representing the 60,000th visitor. Mr. and Mrs. E. A. Soenen, who were in the process of building their home, received an electric range, combination refrigerator-freezer, electric dishwasher-sink with garbage disposal unit, and various small appliances. Mr. Soenen is a maintenance man at the TWA overhaul base in Kansas City.

Promoted as part of the local celebration of "Light's Diamond Jubilee," the Kansas City model electric home contained examples of all the most recent developments in home lighting. One of the principal reasons for its construction was to provide a planned test location for installation of a heat pump. Considerable valuable cooling data were accumulated during one of Kansas City's hottest summers; additional data for the winter season will be obtained through instruments to be left in the home following its sale for normal family occupancy.

Visitors to the all-electric home were allowed only on a room-by-room "conducted tour" basis. Professional models served as hostesses and conducted groups of from 12 to 16 persons through the home, pointing out various details described in the recorded messages played from individual record players in each room. Messages were held to a maximum of three minutes in length and were delivered at eight "stations," namely, outside at the entrance, inside the foyer, in the junior bedroom, the master bedroom, the living room, the kitchen, the utility room and the garage (heat pump) area.

Kuhlman Electric announces expansion

KUHLMAN ELECTRIC CO., Bay City, Mich., manufacturers of power and distribution transformers and electric furnaces, has announced plans for expansion of both the company's factory space and sales coverage.

Celebrating its 60th year in the electrical industry, Kuhlman recently broke ground to provide additional factory and office space for the company's main factory at Bay City. At the same time, Monterey County Industrial Development, Inc., Salinas, Calif., announced that Kuhlman Electric had purchased, subject to confirmation, the assets and machine plant operations of State Metal Fabricators, Inc., of that city. The details of the offer and terms of sale were not revealed.

Kuhlman officials stated the California property will be operated as a Western Division branch plant, with the company's headquarters remaining in Bay City. The company proposes to continue some of the machine plant's operations and utilize the property for manufacturing small transformers and warehousing.

The proposed addition of the California branch factory gives the transformer manufacturing concern better nation-wide sales and manufacturing facilities. A Southern Division branch plant in Crystal Springs, Miss., was acquired and has been in operation for the past two years.

Participating in negotiations for the sale and acquisition of the Salinas property were H. E. Greenwalt, vice - president and G. R. Fluehr, secretary-treasurer of Kuhlman Electric.

Miami boasts largest heat pump installation

THE LARGEST INSTALLATION of packaged heat pumps in the world was introduced in Miami Beach, Fla., recently as the swank Golden Gate motel-hotel project opened its doors at a gala weekend celebration.

Eighty-nine General Electric Weathertrons heat and cool 500 of the project's 650 rooms. The 89 units are used in the motel section of the project and total 357 horsepower. All units are located against outside walls of individual equipment rooms for easy access to outside air.

Mechanical Contractors Supply, Inc., Weathertron distributor of Winter Park, Fla., made the installation of 44 three hp units and 45 five hp units.

Operating on the heat pump principle, the G-E Weathertron cools when the weather is hot and heats when it's cold, using only air and electricity. To cool, it takes the heat from the indoor air and pumps it outdoors. To heat, it extracts warmth from outside air and circulates it indoors. Heat can be extracted from outside air even when it is below freezing. All operations are completely automatic.

The Golden Gate resort is a 20

Harry B. Munsell, right, president, Kansas City Power & Light Co., welcomes family representing 60,000th visitor to the all-electric home designed and constructed by the utility in one of Kansas City's new residential areas. The couple, Mr. and Mrs. E. A. Soenen, were presented a complete all-electric kitchen by Mr. Munsell on behalf of Kansas City Power & Light.

THE NEW DUNCAN SINGLEPHASE METER

TYPE MK*

TYPE MK-S

TYPE MK-A

The Duncan Type MK singlephase watthour meter is a completely new design with increased capacity to keep ahead of the expanding use of electric energy. The general purpose service Type MK meter, although nominally rated at 15 amperes, has "extended range" capacity to accurately meter continuous loads to 100 amperes. This has been done with no sacrifice of performance at lighter loads.

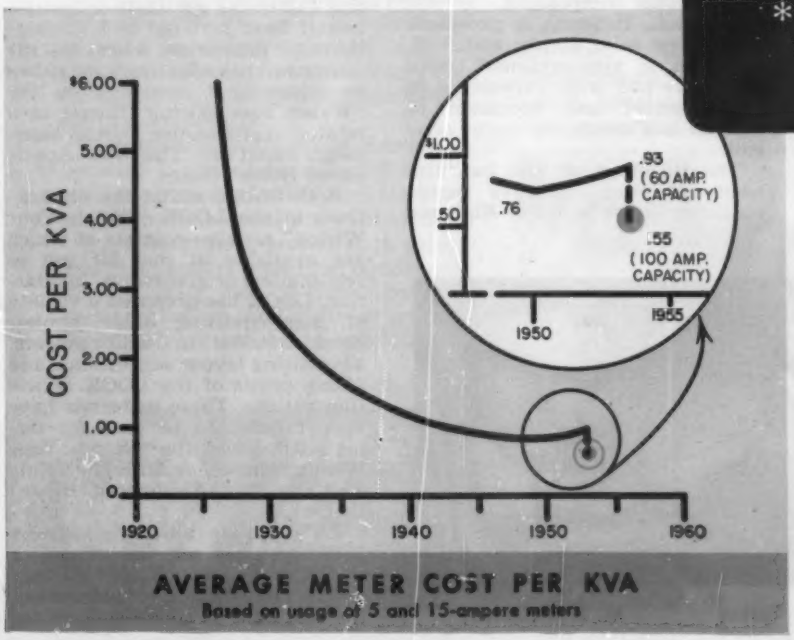
The MK Gives You:

- **CAPACITY** — "Extended range" load characteristic *plus* adequate thermal capacity — metering of services to 100 amperes.
- **COORDINATED INSULATION** — Coils molded in polyvinyl chloride — protective gaps flash over at 4,500 volts r.m.s. — approximately one-half of the insulation level.
- **CONTINUING DUNCAN FEATURES** — Adjustments accessible from front . . . No adjustments of worm wheel mesh or bearings necessary . . . Alnico damping magnet . . . Time proven bearings . . . Convenient register re-set.

DUNCAN ELECTRIC MFG. CO.

LAFAYETTE **INDIANA**

Pioneers in Extended Range Metering



AVERAGE METER COST PER KVA

Based on usage of 5 and 15-ampere meters

* *MK Means More Kva*

for

LOWER COST METERING

acre tract stretching from the Atlantic Ocean to upper Biscayne Bay. It includes a 150 room hotel on the ocean and a bay colony with villas, apartments, and cottages for motoring tourists, plus shopping, bar, medical, and dental facilities. The ocean and bay sections of the resort are connected by a tunnel under Collins Avenue, famous Miami Beach resort street.

Heat pumps in multiple installation are proving particularly adaptable for motels because they switch from heating to cooling automatically, are easy to install and maintain, and because individual units can be turned off when the motel is partially occupied, according to General Electric.

Guests at the weekend celebration included Washington and United Nations dignitaries flown to Miami Beach in a specially chartered plane.

GE personnel in attendance included Claude Hendon, commercial vice-president of the Southeastern district, H. W. Williamson, marketing manager of the Weathertron Department, and R. W. Tribble, Weathertron sales representative.

Allen appointed Anaconda sales vice-president

DAVID E. ALLEN has been appointed vice-president in charge of sales; and Charles H. Porter and Maurice J. McCarthy have been named commercial vice-presidents of Anaconda Wire & Cable Co., New York, N. Y. The announcement was made today by H. Donn Keresey, president of the company. L. R. Love, formerly vice-president in charge of sales, will remain as vice-president of the company, acting in an advisory capacity to the officers.

Mr. Allen, a graduate of the U. S. Naval Academy at Annapolis, held several positions in the utility industry before joining Anaconda W&C in 1932. He is well known in the Southeast having made his headquarters in Atlanta for many years as district manager. He has served in various capacities in sales and engineering, both in headquarters at Hastings-on-Hudson and on field service; became in 1948 assistant chief engineer, then sales manager and, finally, general sales manager, a position he has occupied since 1952.

Mr. Porter formerly was assistant sales manager. His previous associations had included Anaconda Copper Mining Co. (Rolling Mill Division), and The American Brass Co., where he was active in that firm's Wire Sales Division. He joined Anaconda W&C in 1929 as district manager for Cincinnati. In 1937, he transferred to New York as general district manager and became, successively, eastern sales manager, manager of industrial sales and, in 1952, assistant sales manager.

Mr. McCarthy previously was assistant sales manager. He joined Anaconda Wire & Cable Co. in 1930. In 1932, he was assigned to the Cleveland office of the company as salesman; and in 1936 he was appointed district manager for the Cincinnati office. Four years later he was named manager of magnet wire sales, with offices in Muskegon, Michigan. In 1952, he became assistant sales manager.

Howarth sales agency adds Standard, Allen-Bradley

JAMES L. HOWARTH CO., INC., 3021 Seventh Ave., Birmingham, Ala., a newly incorporated sales agency, has been appointed Alabama sales representative for the Allen-Bradley Co., Milwaukee, Wis., manufacturers of manual and automatic motor controls, as well as electronic components.

James L. Howarth is president of the new sales agency and R. S. Morrison is vice-president. Both men have had wide experience in the selection and operation of manual and automatic motor controls.

The Birmingham firm has also been appointed exclusive representative in the states of Alabama and Georgia for the Standard Transformer Co., Warren, Ohio. This appointment covers the entire line of Standard transformers for distribution, power, metering, street lighting, and testing.

Look launches appliance merchandising program

TO HELP APPLIANCE manufacturers and dealers increase sales of the industry's products, LOOK Magazine has launched a new Appliance Merchandising Program.

The new program will include hard-hitting merchandising events which will enable manufacturers, distributors, and retailers to promote and sell effectively LOOK advertised traffic appliances such as toasters, irons, waffle irons; larger household appliances, or "white goods"; vacuum cleaners, radios, phonographs and TV sets, etc.

The first promotion in the new program is designed to tie-in with the electrical appliance industry's "adequate wiring" campaign, and is based on a LOOK editorial feature entitled "What Your Wiring," appearing in the November 2nd issue.

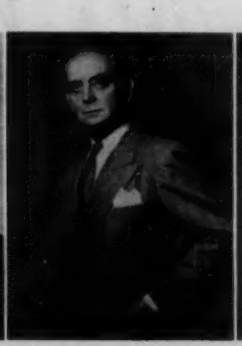
This kick-off promotion, which will run through January, 1955, will be followed up with an expanded program during the rest of the year. A nationwide Mother's Day Promotion is planned for late Spring, and another nationwide selling event for the Fall. LOOK will include intensive trade advertising and publicity campaigns as part of its Appliance Merchandising Program.

The magazine's initial efforts this Fall in the appliance industry's behalf have resulted in a double-barreled promotion, which the industry can use effectively for either an educational campaign on the "Watch Your Wiring" theme, or a related merchandise selling campaign based on "The Well-Applianced Home" theme.

Both themes utilize the illustrations in the LOOK "Watch Your Wiring" article—reprints of which are available at cost for use as self-mailers or giveaways. In addition, LOOK has prepared a variety of merchandising aids: jumbo-sized window or wall posters; advertising layout suggestions; and glossy prints of the LOOK article illustrations. These materials have been tailored to be used for tie-ins with either the "Watch Your Wiring" theme, or with the related "The Well-Applianced Home" theme.

To stimulate all-out efforts by participants to put the impact of LOOK's "Watch Your Wiring" feature to work in their sales areas, the magazine is sponsoring an in-

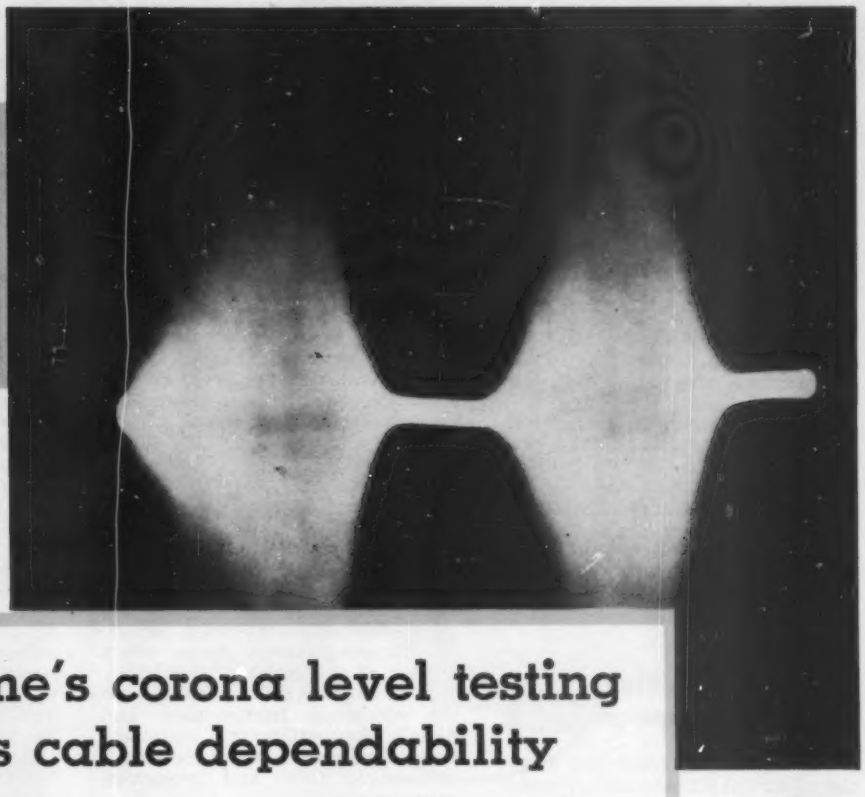
D. E. Allen



C. H. Porter

M. J. McCarthy

Specially designed ionization detector for routine factory use measures corona level of all-insulated cables rated at 3000 volts or over.



Why Rome's corona level testing assures cable dependability

The picture above means trouble. It is an oscilloscope trace of internal ionization in an insulated cable.

Ionization is caused by the electrical break-down of air in pockets within the insulation, or between the insulation and conductor or shield. Should this ionization occur at a value below the operating voltage of the cable, several destructive electrical effects may occur such as possible ozone cutting, reduced dielectric strength, and a substantial increase in dielectric losses. Any of these hazards could result in early failure or reduce the efficient performance life of the cable.

Ionization is particularly dangerous because it cannot be detected by the ordinary visual, physical and electrical testing methods usually applied to cable.

So, to prevent guesswork, to assure you of maximum protection against ionization, *every foot of Rome insulated cable, rated at 3000 volts or over, is thoroughly tested by a specially designed ionization detector.* This instrument accurately measures the corona level of the entire cable. Unless the ionization voltage exceeds the intended operating voltage of the cable, the cable is rejected.

This is one more extra step in Rome Cable's standard manufacturing procedure that assures dependability. This completely new *NONDESTRUCTIVE* method of testing was developed by Rome Cable engineers and was first described in AIEE paper 48-198, "The Measurement and Investigation of Ionization Level of Rubber Insulated Cables," presented in August, 1948.

This X-ray reveals loose insulation—a major cause of ionization.

500,000 CM stranded single conductor RoZone insulated, shielded, RoPrene sheathed power cable . . . 15,000 volts, grounded neutral.

ROME CABLE Corporation
ROME · NEW YORK
and
TORRANCE · CALIFORNIA

ROME CABLE CORPORATION, Dept. ES-12, Rome, N. Y.
Please send me information on corona level testing.
Name
Company
Address
City Zone State

dustry-wide competition, and is offering trophy awards for the most successful tie-in wiring campaigns conducted in four major categories. For the utility company doing the most effective job of developing consumer acceptance for the need of adequate wiring, LOOK is offering a "Community Service Award." And for the appliance dealer with the top performance in sales through use of the LOOK materials, there is a LOOK "Merchandising Achievement Award." Similar "Merchandising Achievement Awards" will be given for outstanding tie-ins by distributors and electrical contractors.

Complete information concerning LOOK's initial appliance promotion and rules for the industry awards competition—plus information on LOOK's 1955 program—can be obtained by writing to Bernard D. Lee, Appliance Merchandising Manager, LOOK Magazine, 488 Madison Avenue, New York 22, N. Y.

Wiremold sets 'Plug Plugmold' campaign

AN AGGRESSIVE CAMPAIGN to assist electrical jobbers and electrical contractors in promoting the industry's huge electrical modernization program has been launched by the Wiremold Company, Hartford, Conn. The objective is to stimulate interest in Plugmold, the multiple-outlet system that provides electrical outlets all around a room or any part of it.

Because of the increasing number of electrical appliances, such outlets are rapidly becoming a necessity in homes, offices, stores, factories, and institutions. The "Plug Plugmold" campaign thus ties in to an important electrical modernization need, with a product that is easy to install and which meets the requirements of good appearance, safety, and moderate cost.

While encouraging the contractor to go after electrical outlet business, Wiremold points out that projected installations of Plugmold will in many cases disclose badly needed rewiring jobs and thus prove to be an opening wedge to help secure larger contracts.

As an incentive to jobber salesmen and contractors to get active in the "Plug Plugmold" campaign, the company is awarding valuable merchandise prizes for sales of all types of Plugmold. A prize point system has been worked out that does not require meeting a sales quota or competing for prizes. Participants work for prizes of their own choosing and can obtain them as soon as they accumulate enough prize points. Both jobber salesmen and electrical contractors receive prize points on all sales of Plugmold during the period of the campaign, from October 1, 1954 to July 1, 1955.

In order to provide the contractor with first-hand knowledge and working experience on the product and to give him a tool for merchandising it to his customers, Wiremold has made available a special new Kitchen Package, which consists of a five-foot wired section of Plugmold in white finish with six NEMA grounded outlets on nine-inch centers. This is intended for installation above the kitchen counter, where the need for multiple outlets is particularly urgent.

Southern States Equipment holds sales conference

SOUTHERN STATES Equipment Corp., Hampton, Ga., concluded a three-day sales conference recently. Representatives from every section of the country attended.

J. E. Cordell, sales manager for the electrical transmission and distribution equipment manufacturer, announced at the meeting a stepped-up sales and promotion program for 1955.

Those attending the biennial meeting were: R. D. Andrews, Los Angeles; F. S. Bacon, Boston; John S. Baron, Nashville; C. L. Bass, Tulsa; Jack Belcher, Jacksonville; A. C. Blaese, Battle Creek; John Cadden, New York; Thomas Carse, Albany, N. Y.; Len T. Deloney, Jackson, Miss.; Max Domras, Syracuse; W. H. Eddy, Phoenix; Norman Fenton, Phoenix; Edward E. Getsee, Miami; W. W. Gotherman, Charlotte; A. W. Graham, Clovis; Ernest Hover, Silver Spring, Md.; W. H. Petty, Pittsburgh; Lee Rawlings, Salt Lake City; Dale G. Seay, San Antonio; J. A. Sims, Shreveport; R. B. Williamson, Shreveport; W. T. Workinger, Atlanta; and R. C. Young, Chicago.

NEMA elects Metz new group president

ALBERT F. METZ, chairman of the board, and chief executive officer of the Okonite Co., manufacturers of electrical wire and cable, was elected president of the National Electrical Manufacturers Association at a business meeting of the NEMA Board of Governors. The election took place in connection with the annual meeting of the association which was held recently at Atlantic City, N. J.

Mr. Metz, former treasurer of NEMA, and a member of the group's board of governors for several years, succeeds J. H. Jewell, vice-president of the Westinghouse Electric Corp., Pittsburgh, Pa.

In addition to the president, the NEMA Board also elected the following five vice-presidents: W. A. Elliott, president, Elliott Co., Jeannette, Pa.; F. F. Loock, president, Allen-Bradley Co., Milwaukee, Wis.; J. J. Mullen, Jr., president, Moloney Electric Co., St. Louis, Mo.; B. C. Neece, president, Landers, Frary & Clark, New Britain, Conn.; and W. V. O'Brien, vice-president and general manager, Apparatus Sales Division, General

Promotional material available for Wiremold's "Plug Plugmold" campaign includes jobber counter display, merchandise prize book, prize stamp books for jobber salesmen and contractors, folders and bulletins.

Electric Co., New York, N. Y.

A. A. Berard, president, Ward Leonard Electric Co., Mt. Vernon, N. Y., was elected treasurer of the association for the coming year.

Cary Chapman & Company announces organization

ANNOUNCEMENT of the formation of a new manufacturer's representative firm at 672 Whitehall St., S. W., Atlanta, Ga., has been made by Cary Chapman. The firm, which will be known as Cary Chapman & Co., includes, in addition to Mr. Chapman, William H. Maxwell, Jr., D. C. Scivley, Jr., R. C. Whiting, Ralph S. Winn, and Robert Chapman. Mr. Chapman was formerly a partner in the firm of Fulwiler & Chapman, which is being dissolved. The new firm will begin operations on January 1, 1955.

Cary Chapman

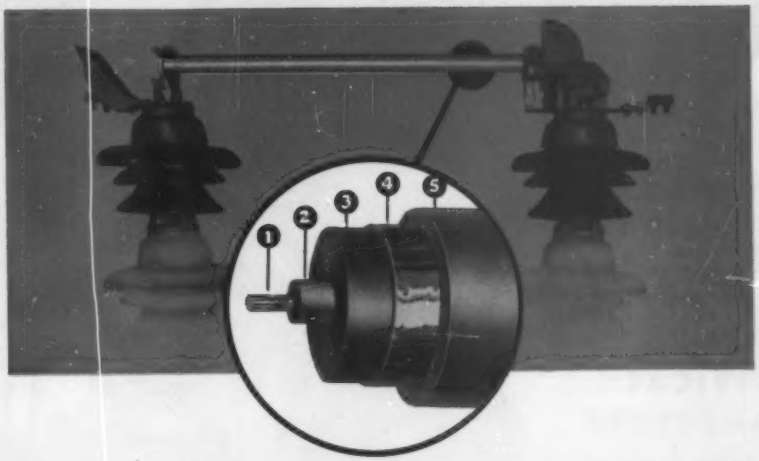
Among the manufacturers to be represented by the Chapman organization are Bar-Brook Manufacturing Co., Collyer Insulated Wire Co., Fullman Manufacturing Co., and Sylvania Electric Products, Inc., Electronic Division.

H. P. Ivey will be charge of the firm's Atlanta warehouse. D. W. Oldham will be in charge of operations from the firm's warehouse at 1009 S. Elm St., Greensboro, N. C., and F. A. Zeller at 213 S. Front St., New Orleans, La.

Dr. Lowry addresses Georgia IES Section

DR. ERWIN F. LOWRY, manager of the Lighting Division Laboratories, Sylvania Electric Products, Inc., presented the interesting and inspiring story of the development of the fluorescent lamp at a recent meeting of the Georgia Section, Illuminating Engineering Society, in Atlanta. The fluorescent lamp, a growing teen-ager with the electrical industry, now 14 years old,

USCO's New High Voltage Fuse Eliminates Corona from Fuse Links. Lasts Many Times Longer than Ordinary Open Type Fuses



Frequent inspections and replacements in most cases are no longer necessary. This new, expulsion fuse cuts down heavily on high service costs, quite frequently eliminates need for expensive oil circuit breakers, chemical or liquid type fuses.

This is accomplished by transferring the electro-static discharge from the surface of the fuse link to the outer surface of the fuse tube. The resistive layer (#4 on diagram) reduces the potential difference between the fuse link and the outer surface of the tube to practically zero. This reduction substantially eliminates the corona ordinarily present around the fusible elements of the fuse link, thus preventing corrosion and extending the life of the fuse link to many times that of ordinary fuses. Life of the fuse tube is also extended because the cause of damage to the fiber liner is eliminated.

Structure: The improved fuse-link tube structure includes an internal cylindrical fiber liner (2) extending between end terminals and through which the fuse link (1) passes. A relatively thick cylindrical body (3) of Laminated Phenolic surrounds the fuse link and the horn fiber liner. A layer of electrically resistive material (4) having a high value of resistivity covers the entire exterior surface of the body. An external layer (5) of Laminated Phenolic provides a protective insulating wrapper. USCO's corona-resistant fuse tubes are adaptable for use in all expulsion type fuses 46 through 161 KV.

For Details Contact Our Nearest Representative or Factory.

Another New Development in Electrical Power Transmission Equipment by

USCO

USCO Power Equipment Corp.

829 North 36th Way, Birmingham 4, Alabama — Phone 59-7241

Designers and manufacturers of high voltage electrical equipment.

...thanks to HUBBELL Twist-Lock® TRADE-MARK 4-WIRE ELECTRICAL CONNECTORS

Wherever portable electrical apparatus is used, Hubbell Twist-Lock is recommended for 2, 3 or 4-wire systems.

Twist-Lock 3 and 4-wire sizes are available grounded and not grounded.

7413 Connector body

Mobile cafeteria trains, an entirely new idea in feeding large numbers of employees, are now employed at the new Torrence location of the El Segundo Division of Douglas Aircraft Company, Inc., California. The food is transported to all parts of the 214-acre plant, piping hot and ready to serve, by means of 12 three-car trains.

Hubbell Twist-Locks play an important part in this operation. When the battery-powered train pulls up to its station, the operator Twist-Locks the unit to a plant outlet to supply power for refrigerators, ovens, etc. In addition, each car is inter-connected with 4-wire Twist-Locks.

Here is another practical modern application showing the versatility and dependability of Twist-Lock, first and still the finest self-locking connector made.

7408 Flush Motor base

4893 Seal-lite rubber cover and chain used to close face of 7408 when not in use. (Unit not shown)

Hubbell sales engineers will gladly consult with you on special problems. Write Dept. R-2 today for help or information.

Highest Grade HEAVY DUTY WIRING HUBBELL DEVICES

HARVEY HUBBELL, INC.
BRIDGEPORT, CONNECTICUT

21HH54R

has been improved in light output, in color, and in efficiency.

The improvements were brought about by new discoveries and new design of the lamp auxiliaries. The discovery of a more stabilized phosphor permitted the lamp to be operated under less gaseous pressures. By redesigning the lamp ends and the lamp holders or sockets, the electrical contacts and operation were improved.

With this new development and new design, the rapid-start ballast will play a most important part in fluorescent operation. Dr. Lowry's opinion was that in the next three years the electrical industry may seriously consider standardizing on the rapid-start method. The new 100 watt rapid-start lamp is now being produced by the lamp industry. The lighting fixture manufacturers are redesigning their products to house the new lamp.

Dr. Lowry introduced a look into the future by presenting the panelescent lamp. The panelescent lamp was a square piece of glass about the size of a 12-inch acoustic tile, coated with phosphorescent powders having two electrical contacts. When energized, the square lamp became a luminous source of light. Dr. Lowry stated that this lamp is now in the development stages, but in the future it may mean luminous panel ceilings, luminous window blinds, and many other applications not yet determined by the electrical public.

Federal Pacific opens new Scranton plant

FEDERAL PACIFIC Electric Co., Newark, N. J., has officially opened its new plant in Scranton, Pa., it is announced by Joseph S. Thompson, president, and Thomas M. Cole, executive vice-president.

The multi-million dollar plant is the headquarters of Federal's newly-organized Eastern Switchgear Division, the third such division created by the company to handle its expanding manufacturing and sales activities.

Square D reorganizes sales, ad departments

THE SALES DIVISION of the Square D Co., Detroit, Mich., has reorganized its sales, advertising and promotion departments and realigned the functions of key executives, it was announced recently by Frank H. Roby, vice-president. Simultaneously, Mr. Roby revealed that Square D is launching the most extensive advertising and sales promotion campaign in the company's 51 year history.

(*Continued on page* 56)

ANDERSON *dependability turns on the lights...*

In Chicago... Prairie View or Portland... when the lights go on, *no one asks "how" or "why".* It's a miracle that's taken for granted. No one sees or cares about the countless connections from lead-in cables to transformers, from transformers to main line... and on back to sub-stations and power plants. *Not anybody, except the power company men whose responsibility it is to assure the community an uninterrupted flow of electricity.*

ANDERSON is one of the makers of connectors, who shares this responsibility with the power men.

ANDERSON DEPENDABILITY is a *standard,* trustingly recognized by the country's leading power companies, and held as "guide" in the selection of *any* clamp, connector, fitting or accessory. When engineers specify ANDERSON *they guarantee extra dependability and longer service life.*

Another point . . . from generator to service entrance, ANDERSON is the only manufacturer who makes all the connectors required.

TYPE AS...
ALUMINUM SUSPENSION CLAMP

For ACSR with straight, tapered or preformed aluminum armor rods. No lines required.

TYPE SWH...
BRONZE SWITCH CONNECTOR
Cable to Flat

For connecting various size copper cables to switches and other electrical equipment.

TYPE BSCP...
BRONZE STUD CONNECTOR

For connecting copper cable to threaded bushing studs. For transformers, oil circuit breakers and other similar equipment.

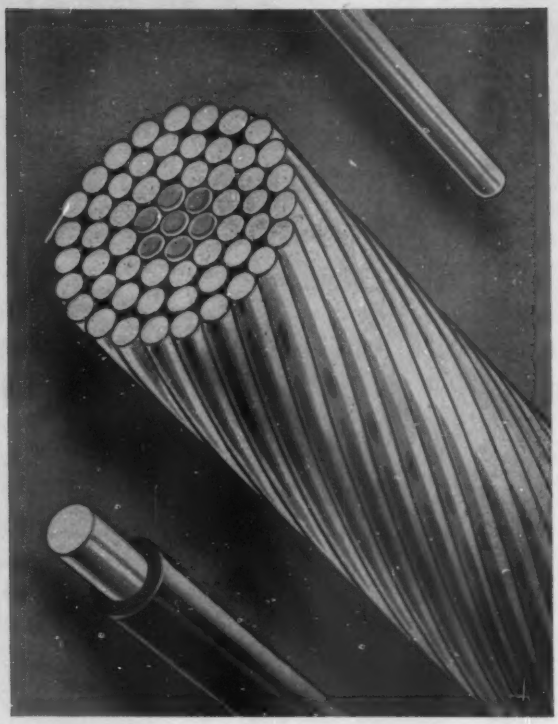
ANDERSON

BRASS WORKS, INC.
BIRMINGHAM
ALABAMA

FOR MORE COMPLETE INFORMATION consult your nearest ABW representative or contact our home office.

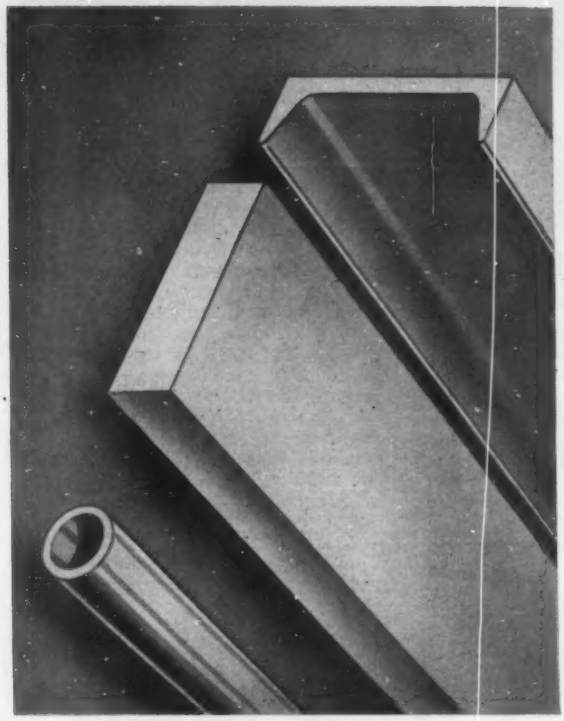
Covered Wire and Service Drop

ACSR and All-Aluminum Wire and Cable

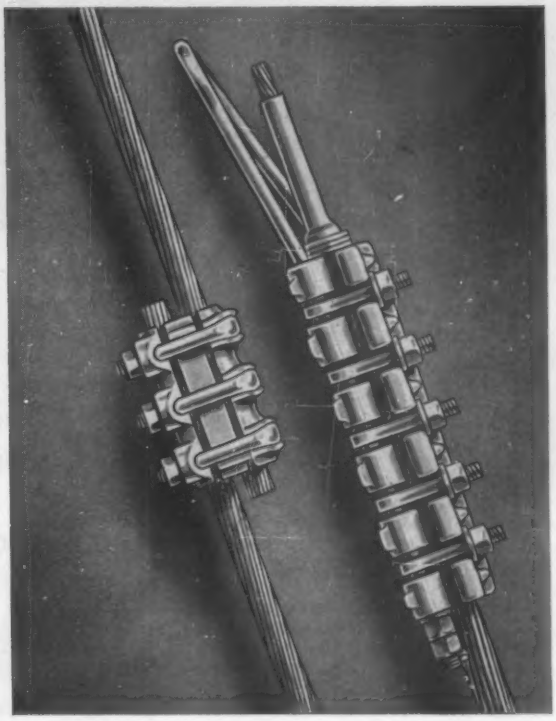


There is only ONE transmission conductors, accessories backed experience...

Rectangular and Tubular Bus



Fittings and Accessories



complete line of aluminum distribution conductors and by 56 years of

ALCOA ALUMINUM

ALUMINUM COMPANY OF AMERICA

W. H. Younger M. P. Kartalia R. E. King E. N. Cobb

. Square D is a major manufacturer of electrical distribution and control equipment, with seven U. S. plants and others in Toronto and Mexico City. In addition, the company is constructing a new manufacturing facility at Secaucus, N. J., and recently announced the acquisition of the Iowa National Manufacturing Co., Cedar Rapids, as phases of a general expansion program.

Mr. Roby revealed that Mitchell P. Kartalia, manager of merchandise sales, has been appointed manager of distribution equipment sales and will now devote full time to Square D's expanding markets in the field. Mr. Kartalia joined Square D in 1940 as an application engineer in the company's industrial controller division. More recently he has divided his time between internal sales responsibilities and the company's wholesale distributor organization.

William H. Younger, manager of advertising, has been named manager of merchandise sales and advertising for both industrial control and distribution equipment. He will also function as chairman of the Distributor Policy Committee, a key group formed recently to integrate merchandising policies of the company's various operating units. In his new position, Mr. Younger, who joined Square D in 1947 in a field sales engineering capacity, will coordinate the expanded merchandising, advertising and sales promotion activities.

Edwin N. Cobb, operating manager of Square D's field sales office in Birmingham, Ala., since 1948, has been appointed equipment specialist and will assist Mr. Kartalia in liaison with distribution equipment markets, and handle special assignments in selected sales areas. Also reporting to Mr. Kartalia will be Robert E. King, who will continue to supervise the Detroit Headquarters Sales Department. Mr. King joined Square D in the Cincinnati field sales office in 1948 and assumed his present duties last year.

Mr. Roby stated that Square D is developing new products and has plans to enter new markets as part of the company's current overall expansion program. Products now range from small, mass-produced pressure switches and circuit breakers to tailor-made switchboards and control panels weighing many tons.

Kennecott Copper offers adequate wiring booklet

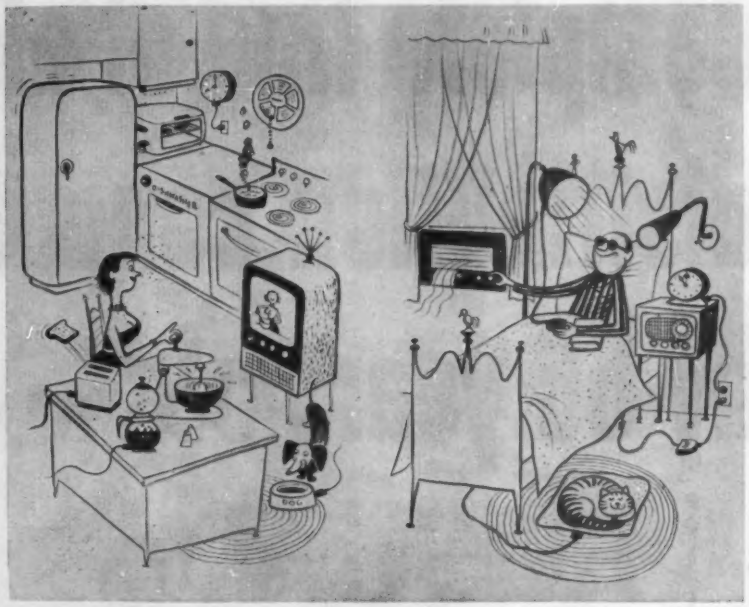
A NEW ILLUSTRATED BOOKLET, "The ABC of Home Wiring," has just been published by the Kennecott Copper Corp., New York, N. Y., as part of its combined advertising and public relations program to familiarize homeowners with the problems of inadequate residential wiring. It is available upon request and without charge.

Although the electrical industry is familiar with the problem of 34 million inadequately wired homes, the owners of the vast majority of these houses are ignorant of the facts which make the problem. All they know is that fuses keep blowing and circuit breakers tripping . . . and they don't have the information to map a program to remedy the situation.

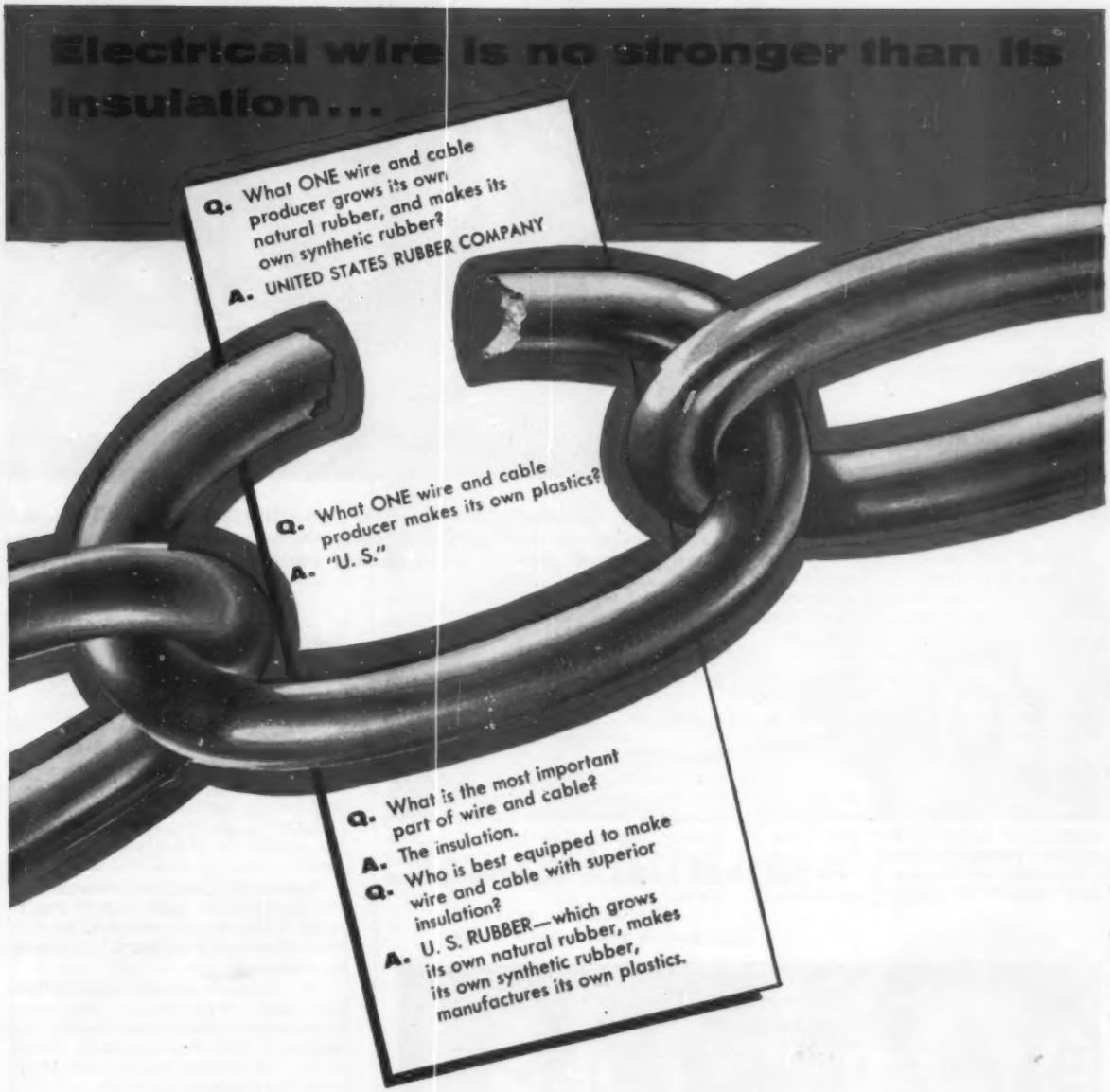
The Kennecott booklet points out that only 20 years ago the average home enjoyed the simple life . . . and was fully wired to make the most of its handful of electrical appliances. However, today about 60 appliances are available, with some of them requiring as much current as was needed to supply the entire house of 1935!

Kennecott has used a breezy style and imaginative cartoons in covering the subject of home wiring. Types of wiring for all kinds of electrical devices, ranging from house lights to electric stoves are discussed. Tables are provided from which the home owner can calculate wattage, wire sizes, fuse or circuit breaker capacities, and all other electrical requirements. It includes a simplified glossary of electrical terms in common use.

The booklet is available for pro-



"You're leading an electrical life!" These two humorous cartoons are typical of those used throughout the Kennecott Copper Corporation's new adequate home wiring booklet, "The ABC of Home Wiring." In addition to this touch of humor, the booklet is filled with helpful information that shows the home owner the type of electrical service needed for various appliances, what is needed to bring an old house up to date, as well as what should be planned for a new one.


Electrical wire is no stronger than its insulation...
Q. What ONE wire and cable producer grows its own natural rubber, and makes its own synthetic rubber?
A. UNITED STATES RUBBER COMPANY
Q. What ONE wire and cable producer makes its own plastics?
A. "U. S."
Q. What is the most important part of wire and cable?
A. The insulation.
Q. Who is best equipped to make wire and cable with superior insulation?
A. U. S. RUBBER—which grows its own natural rubber, makes its own synthetic rubber, manufactures its own plastics.

ELECTRICAL INSULATION IS A "U. S." SPECIALTY!

Isn't it logical that a rubber company should make the best wire and cable insulation there is? U.S. Rubber has been a pioneer in insulation for close to 70 years—has amassed in that time a stockpile of research data and experience that can't be beat. Electrical insulation is a "U.S." specialty! Electrical insulation makes the difference between superior and ordinary wire and cable. Conductors of all manufacturers are standard, but insulation must be the best that science can produce. That's why your best bet in wire and cable is U.S. Rubber.

US RUBBER

UNITED STATES RUBBER COMPANY

ELECTRICAL WIRE & CABLE DEPARTMENT • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

motional use, up to 50 copies free, additional quantities at $5 for each 100. Space is provided for imprinting on the back cover. Requests for "The ABC of Home Wiring" should be addressed to the Kennecott Copper Corp., Box 238, New York 46, N. Y.

Also available for promotional purposes are reprints of institutional consumer ads; blow-ups of consumer ads; five, two-column x 5½-inch, mats for electrical contractors; eight, two-colume x three-inch, mats for postal cards for customer mailings; and other direct mail promotions. Requests for any of this material should be addressed to the Kennecott Copper Corp., 161 E. 42nd St., New York 17, N. Y.

Walter V. Gearhart, chairman of the board, left, and Richard H. Osgood, president, of the Gearhart Co., Atlanta, which has recently announced several personnel additions, and expanded warehousing and repair facilities.

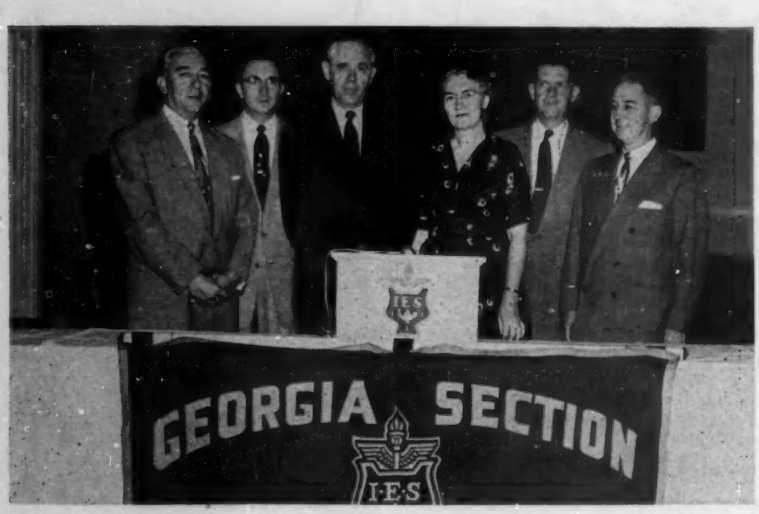
Georgia IES section sponsors joint meeting

SOME 100 MEMBERS and guests of the Illuminating Engineering Society and the Atlanta Residence Lighting Forum were in attendance at their joint dinner meeting recently in Atlanta, Ga.

Paul P. Harrison, chairman of the Georgia Section, introduced and welcomed the guests. Mary E. Bush, forum chairman, presented the speaker of the evening, E. W. Commery.

Mr. Commery, director of the residence lighting development section of General Electric Company's Lamp Division, Nela Park, Cleveland, a Fellow of the IES, and author of many publications on residential lighting application, gave an illustrated talk on "Light for Living—Past, Present, Future."

"In the 1920 era," stated Mr. Commery, "an attempt was made to use cove lighting in residential practice." The deluxe warm white fluorescent lamps are recommended now in residential applications because the color quality more nearly approaches that of incandescent or filament lamps—and this is more acceptable to the home owner.



Paul P. Harrison, chairman, Georgia Section, IES; Wesley F. Johnson, secretary and treasurer; E. W. Commery, guest speaker; Mary E. Bush, chairman, Atlanta Resident Lighting Forum; Judd Lough, vice-chairman, IES and the Lighting Forum; and L. J. Campbell, General Electric Co., left to right, are shown at the recent joint meeting of the Georgia Section, IES, and the Lighting Forum.

Gearhart Company expands engineering sales agency

THE GEARHART CO., Box 85, Northside Station, Atlanta, Ga., has announced several personnel additions, and ex anded warehousing and repair facilities to serve major industrial, power, and large service plants in the Carolinas, Tennessee, Georgia and Florida.

Walter V. Gearhart, founder of the company in 1926, is now chairman of the board and chief executive officer, and Richard H. Osgood is president.

Mr. Osgood recently joined the Gearhart organization following nine years as Southeastern district manager for the General Cable Corp., and previously, 19 years with the Okonite Co.

Other officers of the Gearhart organization include J. Robert David, executive vice-president; Elwyn G. Riley, vice-president and transformer consultant; J. H. Reid, motor and generator consultant; and William E. Bell, office and warehouse manager.

The company has considerably expanded warehouse and service facilities for the electrical equipment manufacturers it represents. Gearhart's accounts include: Duncan Electric Mfg. Co., watthour meters; Esterline-Angus Co., recording instruments; Superior Switchboard & Device Co., Eastern Specialty Co., test instruments; Pennsylvania Transformer Co., Division of McGraw Electric Co.; T. J. Cope, Inc., cable troughs; Euclid Electric & Mfg. Co., electric motor controls; Electric Products Co., motor generators and specialties;

Automatic Controls, liquid level controls; and Dynamatic Division, Eaton Mfg. Co.

Dates Ahead

American Institute of Electrical Engineers, Winter General Meeting, Hotel Statler, New York, N. Y., Jan. 31-Feb. 4, 1955.

Southeastern Electrical Wholesalers Association, Fifth Annual Industry Day Meeting, Atlanta Biltmore Hotel, Atlanta, Ga., Feb. 2-4, 1955. M. L. Tice, Exec. Vice-Pres., P. O. Box 176, Ben Hill, Ga., Tel.: Atlanta Amherst 6182.

Florida Electrical Exposition, 9th Annual Exposition, sponsored by Tampa Electric Co., Florida State Fair, Tampa, Fla., Feb. 5-19, 1955.

Edison Electric Institute, Transmission and Distribution Committee, Shoreham Hotel, Washington, D. C., Feb. 10-11, 1955.

Public Utility Buyers' Group, National Association of Purchasing Agents, 24th annual Mid-Winter Conference, the Shamrock Hotel, Houston, Tex., Feb. 13-15, 1955.

Southern Safety Conference and Exposition, Jung Hotel, New Orleans, La., Feb. 27-28, March 1, 1955. W. L. Groth, Exec. Dir., P. O. Box 8927, Richmond 25, Va.

American Institute of Electrical Engineers, Utilization of Aluminum Conference, William Penn Hotel, Pittsburgh, Pa., March 15-17, 1955.

Oklahoma Utilities Association, Annual Convention, Mayo Hotel, Tulsa, Okla., March 24-25, 1955.

American Institute of Electrical Engineers, Southern District Meeting, St. Petersburg, Fla., April 13-15, 1955.

American Institute of Electrical Engineers, Electric Heating Conference, LaSalle Hotel, Chicago, May 10-11, 1955.

National Industrial Service Association, 22nd annual convention of the national association of motor repair shops, Hotel Statler, Los Angeles, Calif., June 6-10, 1955.

"We like the EASY-TO-SEE SAFETY of B-C boxes"—

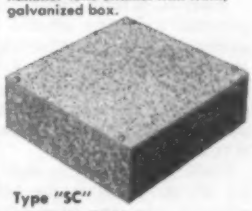
Say Leading Construction and Maintenance Engineers

B-C RUGGED CONSTRUCTION

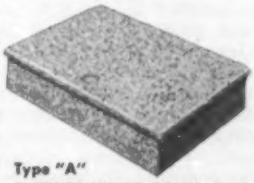
in a type and size to fit every junction or pull box need

For uniform quality, easy workability and long-lasting construction, B&C Telephone Cabinets, Junction and Pull Boxes have proved themselves *a good investment* wherever installed. Every cabinet and box in the large and complete B&C line is constructed in strict compliance with the Underwriters Laboratories Specifications and the National Electrical Code. Only the finest steels are used.

Type "PF" TELEPHONE CABINET *(above)*
Flush mounting. Hard grey hammer-tone enamel trim front, galvanized box.



Type "SC" SURFACE BOX
Screw cover. Hard light grey enamel finish, or galvanized.



Type "A" SURFACE HINGE COVER BOX
Same general specifications as Type "SC" above.

Write for complete catalog data and specifications . . .

Your Seals of Dependability and Safety

B-C METAL STAMPING CO.

590 MEANS ST., N. W., ATLANTA, GEORGIA

News about people

George R. Hoffman has been appointed Southern Regional Manager for the **I-T-E Circuit Breaker Co.**, Philadelphia, Pa., according to an announcement by **R. E. Murphy**, vice-president-sales. Mr. Hoffman will be in charge of the company's

George Hoffman

sales, operating in the Southern territory embracing the states of Texas, Arkansas and East, South of the Northern border of Tennessee and North Carolina.

Mr. Hoffman will be located in the Atlanta area at 403 W. Ponce de Leon Ave., Decatur, Ga.

Paul R. Hartig has been appointed general manager of the **Locke Department, General Electric Co.**, Baltimore, Md. He succeeds **J. W. Seaman** who has been named general manager of the **Power Transformer Department, General Electric Co.**, Pittsfield, Mass.

Both appointments were announced by **W. S. Ginn**, recently named as general manager of the **Transformer Division.**

Mr. Hartig comes to Locke from a position as manager — employee and plant community relations for General Electric in the Pittsfield area. He started his career with the company in 1933 in his native town, Schenectady, N. Y., after receiving a degree from the University of Michigan. His varied assignments in Schenectady included refrigeration planning and industrial control production. Later, he became assistant superintendent of the Holyoke, Mass. G-E plant, then manager of the General Electric plant in Oakland, Calif.

Robert W. Stewart has been appointed manager of distribution for consumer products of **Westinghouse Electric Corp.**, Pittsburgh, Pa. The appointment was announced by **J. M. McKibbin**, vice-president in charge of the consumer products group. Mr. Stewart reports to **Victor D. Kniss**, general sales manager, consumer products.

A native of Cambridge, Ohio, Mr. Stewart was graduated from Muskingum College at New Concord, Ohio, with a Bachelor of Arts degree. In April, 1953, he joined Westinghouse Electric Supply Co. (Wesco), at Cincinnati as district manager for consumer products.

Five months later he was named Southwestern regional manager of consumer products for "Wesco" with headquarters first in Cincinnati and later in St. Louis, Mo.

Roy A. Palmer, merchandising manager, **Duke Power Co.**, Charlotte, N. C., has been named a Fellow in the Illuminating Engineering Society in recognition of his technical leadership in the field of illuminating engineering.

The only IES member of the Fellow grade in the South, Mr. Palmer is one of eight utility men in the United States to earn this distinction. Of the 8,000 members of the Society, only 80 have been elected to the Fellow grade.

Presentation of a certificate of his election was made to Mr. Palmer at a recent meeting of the Carolinas Chapter of IES.

Mr. Palmer has long been noted as an authority in lighting work among Duke Power customers, and has been recognized throughout the country as a pioneer in the field.

Richard G. Robbins, Hubbard and Co., vice-president and general manager of the Pittsburgh and Chicago plants, covering the Eastern and Mid-Western territories, has announced the following promotions and appointments:

Clifford H. Keen, who has been associated with Hubbard in various sales capacities since 1923, has been made assistant general sales manager.

Leonard P. Schafer, with the company for 29 years, has been made Southeastern sales manager. Assisting him will be: **M. E. Harrison** in Florida; **J. H. Awtry** in Alabama and Georgia; and **W. W. Ege, Jr.** in Kentucky, Southwestern Ohio, Southern Indiana, and Central and Eastern Tennessee.

John C. Carroll, Jr., 18 years with Hubbard, has been appointed Midwest sales manager.

Don V. Cole, with Hubbard for 25 years, has been appointed Southwest sales manager and will personally contact the trade in Arkansas, Southern Illinois, Northern Mississippi, Western Tennessee, and Eastern Missouri. He will be assisted by: **G. T. Brundett** in Texas; **Earl C. Nelson** in Kansas, Oklahoma, and Western Missouri; and **James A. Wills** in Louisiana and Southern Mississippi.

Christopher T. Kastner has been appointed sales manager for the **General Electric Company's Medium Transformer Plant** at Rome, Ga., ac-

C. T. Kastner

cording to an announcement by Rome plant manager, **D. B. Lawton.**

Mr. Kastner, whose headquarters will be at Rome, will be responsible for the sales and promotion of medium transformers, the power transformers in the range of ratings 501 to 5000 kva single-phase, 501 to 10,000 kva three-phase, 69 kv and below.

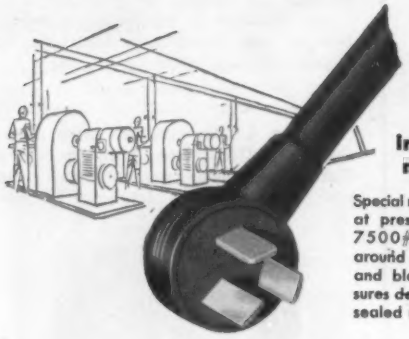
C. H. Keen **L. P. Schafer** **J. C. Carroll, Jr.** **D. V. Cole**

THERE IS A "RIGHT" CORD

For Ranges and Dryers

It's a **PARANITE®** "SAFE" cord

and here's why

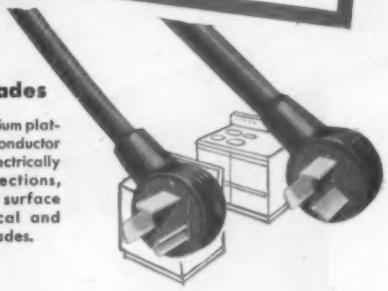


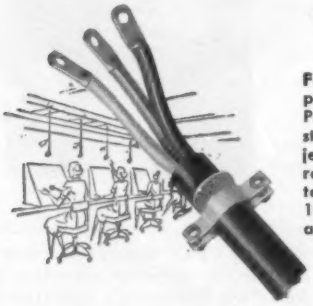
injection molded

Special rubber compound, at pressures exceeding 7500# p.s.i. forced around jacket, insulation and blade junctions insures dense permanently sealed rubber cap.

plated blades

Complete Cadmium plating, from tip to conductor crimp, assures electrically superior connections, better contact surface within receptical and clean bright blades.





100% "cords" control

From rubber, compounded specially at the Paranite Mill, through stranding, insulating, injection molding, strain-reliefs, terminals, and tests, these cords are 100% inspected and UL approved.

electrically superior

Insulation Resistance between conductors exceeds 32,500 meg-ohms. (50 meg-ohms standard). Dense molded cap insures exceedingly high dielectric strength properties.

It takes specially compounded rubber, precisely controlled equipment and close supervision to injection mold these 90° angle caps . . . but look at the results! You get a firm, dense and more uniform permanently molded cap that means complete customer satisfaction.

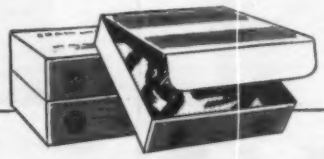
Cadmium plating of blades is another important "extra" you get with all PARANITE Range, Dryer and Appliance Cords . . . which assures a more dependable and surer electrical contact.

PARANITE Cords give outstanding performance . . . Insulation Resistance of over 32,500 meg-ohms and extremely high dielectric qualities prove their superiority.

To perfect, manufacture and 100%-inspect cords of this calibre takes extra effort . . . but PARANITE "Safe" Cords have a reputation to maintain and *they must be* RIGHT!

RANGE CORDS	DRYER CORDS
RP-1 2 #8—1 #10	RP-10-PG 3 #10
RP-2 2 #6—1 #8	
RP-3 3 #6	

separately packed in sturdy cartons



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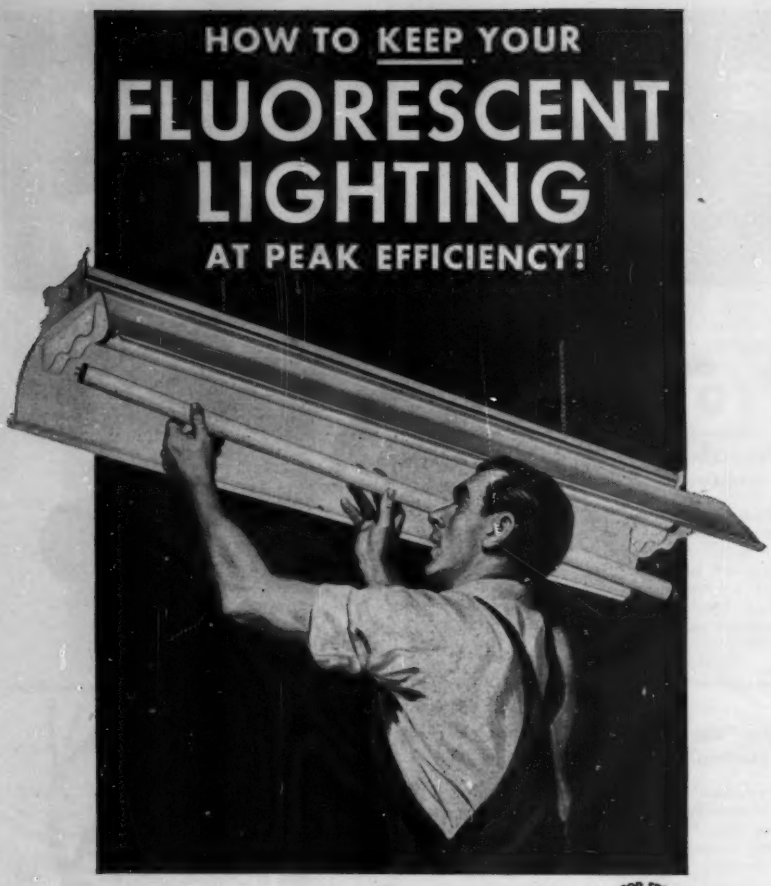
Boston, Mass., 1040 Tremont Street
* Chicago, Illinois, 411 South Peoria Street
Cleveland, Ohio, 1900 Euclid Avenue
Dallas, Texas, 1917 Levee St.
* Detroit, Michigan, 634 Selden Avenue
Hartford, Connecticut, 119 Ann Street
Indianapolis, Indiana, 5219 Crittenden Avenue
* Kansas City, Missouri, 2000 Forest Avenue
* Los Angeles, California, 2240 East Washington Blvd.
Minneapolis, Minnesota, 5407 Excelsior Boulevard
* Newark, New Jersey, 457 Frelinghuysen Avenue
Omaha, Nebraska, 320 W. O. W. Building
* Portland, Oregon, 525 North Tillamook St.
Upper Darby (Philadelphia) Pa., 6816 Market Street
Rochester, New York, 207 Powers Building
* San Diego, California, 1305 Harbor Drive
* Saint Louis, Missouri, 3435 Chouteau Ave.
* San Francisco, California, 1077 Howard Street
Springfield, Illinois, 104 South 6th Street

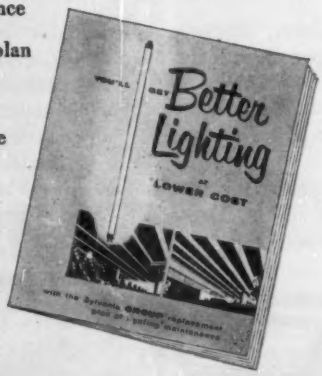


Sylvania's Group Replacement Plan saves money 3 ways

The high efficiency and unbeatable performance of Sylvania Fluorescent Lamps and Fixtures is now matched by a Sylvania maintenance plan which automatically keeps your lighting at highest levels.

By this plan, your lamps are replaced as a group before burnouts become an expensive nuisance. This modern method (1) saves the maintenance time and labor of individual lamp replacement, (2) reduces costly work interruptions, and (3) assures better light for better production, better morale, and better appearance.

Learn more about this advanced lighting plan. Illustrated folder gives full details. For your copy write to Sylvania Dept. 4L-2512, today!



SYLVANIA

2520 Oakville St., Alexandria, Va. • 660 Murphy Avenue, S. W., Atlanta, Ga.
100 Fordyce St., Dallas 2, Texas
Sylvania Electric Products Inc., 1740 Broadway, New York

LIGHTING • RADIO • ELECTRONICS • TELEVISION

A graduate of Yale University with a mechanical engineering degree in 1946, Mr. Kastner previously attended schools in Memphis, Tenn. He joined General Electric in July, 1946, on the company's Test Program. Following Lynn and Schenectady assignments, he went to Power Transformer Sales in Pittsfield. In January, 1952, he was appointed supervisor of traveling specialists and later supervisor of Medium Transformer Sales. He will be succeeded at Pittsfield by **J. Benning Monk.**

Mr. Kastner is an associate member of the American Institute of Electrical Engineers.

Austin Little, general sales manager of **Prescolite Manufacturing Corp.,** has been transferred to the company's Eastern Division in Ne-

A. A. Little

shaminy, Pa., where he will also assume the duties of executive director of the Neshaminy operations.

Preston A. Jones, president of

P. A. Jones

Prescolite, who supervised the building of the Neshaminy plant a year ago and the subsequent installation of Prescolite's unique mechanized production line manufacturing system, has reestablished his offices at the company's Berkeley, Calif., operation.

According to **Wallace Runswick,**

vice-president and general manager of Prescolite, Mr. Little's transfer to Neshaminy is the initial move in expanding their Eastern sales division, where key distributors have been appointed.

Marshall Lewis and **Nathan Tamm** have been appointed to executive positions with **Light & Power Utilities Corp.**, Memphis, Tenn. Mr. Lewis is new sales manager, and Mr. Tamm, plant supervisor, both handling the L & P line of fluorescent lighting fixtures.

A native Memphian, Mr. Lewis graduated from Vanderbilt University in 1939. Following five years service in the Navy, he joined Bluff

Marshall Lewis

City Beverage Co., Memphis, and was general manager of that firm until January, 1954.

Mr. Tamm, veteran of the Army Air Forces, graduated from Purdue University in 1943, with a degree in mechanical engineering. Following his four years of military duty, he was associated with International Harvester in tool engineering, and with Rotary Lift in tooling and methods engineering.

President of Light & Power Utilities Corp., is **Murray Reiter**, who describes the appointment of Mr. Lewis and Mr. Tamm as part of his over-all expansion program, dictated by the firm's rapid growth in the last several years.

T. A. Melady, 801 Airline Park Blvd., Jefferson Parrish, New Orleans, La., has recently been appointed district sales representative in the territory of Louisiana, Mississippi, and Mobile, Ala., for **Electro Silv-A-King Corp.**, Chicago.

Mr. Melady has been in the lighting field since 1949 and is well known to architects, engineers, electrical contractors, electrical wholesalers and industrial concerns in his territory. He is a member of the Illuminating Engineering Society, and New Orleans Electrical Association.

Before organizing his own company, Mr. Melady was associated with Westinghouse Supply Co., Gen-

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Buffalo
BREEZO FANS
Quiet · Efficient · Rugged
Enjoy the Cooling Freshness of Morning Air
CAPACITIES FOR ALL REQUIREMENTS
ASK US ABOUT YOUR PROBLEM

Put These Colorful Shopper-Stoppers To Work And Watch These Quality BREEZOS Move!

FREE COUNTER DISPLAY for "Buffalo" dealers and distributors. Red, green and brown, with design duplicated on both sides. 21" wide by 10" deep by 35" high assembled. Accommodates one 16" design "A" NV-BREEZO (fan available at stocking distributor price). Can be used as demonstrator for many easy sales, too—customers are readily "sold" when they see how quietly and quickly this husky fan exhausts hot, stale air.

COMPACT FLOOR TYPE "STOPPER," 45" wide by 20" deep by 72" high with green, brown and red display duplicated on both sides. Easy to assemble. Available to active "Buffalo" dealers and distributors at net cost of $17.00 when accompanied by order for the 8", 12" and 16" Design "A" NV-BREEZOS which the stand displays.

Better get your order in now for one or both for your biggest fan year ever! Immediate shipment from stock. Also order your FREE advertising pieces with your name imprinted.

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Sales Representatives in all Principal Cities

Panel Breezo Fans
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Belt-Air Fans
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NOW AVAILABLE

FROM NATION-WIDE WAREHOUSE STOCKS*

BIG CABLES

WITH THE SUPERB

TOUGHNESS

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FLEXIBILITY

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Certified **60**

Bronco 60 Certified Type W cables are made in all sizes from 8/2 to 1/4. They have a tough Neoprene jacket certified by a registered professional engineer to contain not less than 65.46% Neoprene. Made with coarse or fine stranding, Certified Type W possesses incomparable flexibility. The proof is in the product. Try Bronco 60 Certified Type W—you'll standardize with Certified.

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eral Electric Supply Co., as a lamp specialist, and most recently with Al Levin & Associates.

J. H. Hildreth, 4212 Sherry Lane, Dallas, Texas, has been appointed representative for the **Novelty Lighting Corp.**, Cleveland, Ohio, in the Southern territory, according to an announcement by **M. W. Terkel** of

J. H. Hildreth

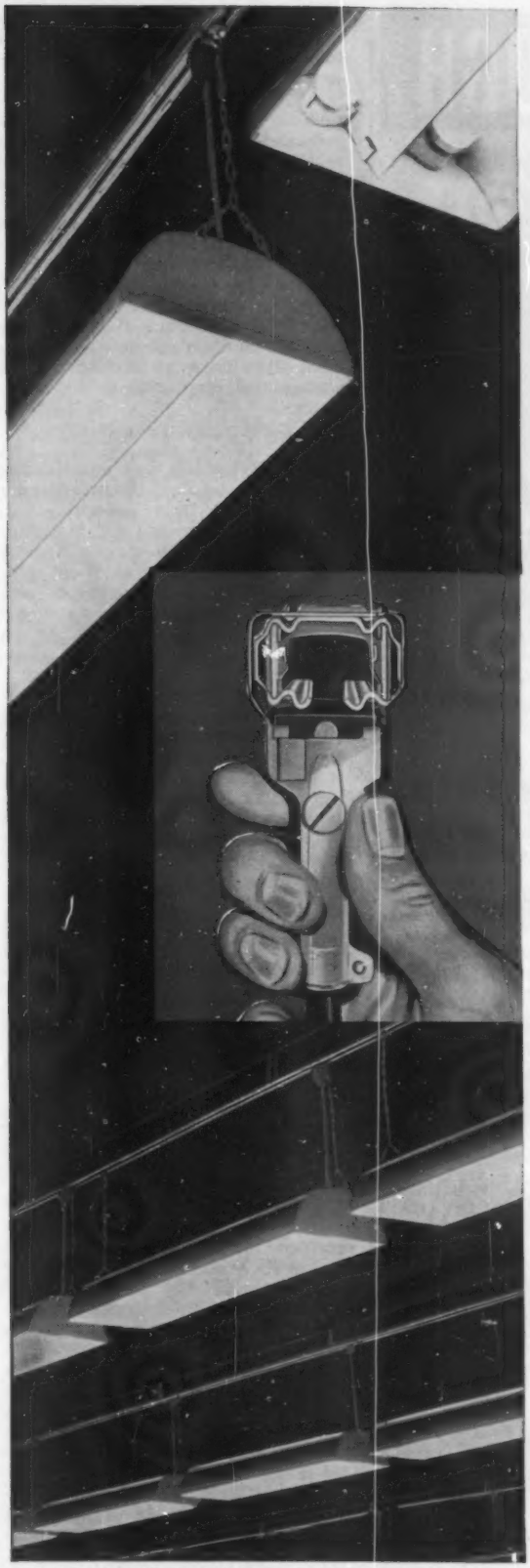
the lighting manufacturer's home office.

Mr. Hildreth will represent the Cleveland firm in the states of Texas, Oklahoma, Tennessee, North and South Carolina, Mississippi, Louisiana, Alabama, Arkansas and Florida. He was formerly associated with Graybar Electric Co., and for the past eight years represented Marlin Associates, Dallas, in the state of Texas.

The appointment of **Charles H. Goddard** as manager of utility sales for **Sylvania Electric Products, Inc.**, Salem, Mass., was announced recently by **Charles A Burton**, general sales manager of the company's Lighting Division. Mr. Goddard previously had been in charge of marketing and product planning for the Lighting Division.

Divisional sales manager of national accounts from 1950 to 1953, Mr. Goddard has been closely associated with the electrical industry since 1929, principally in the lighting, utility, and manufacturing fields. He became a member of the Sylvania organization in 1944 as merchandising manager of lighting fixtures. Two years later he was appointed assistant general sales manager of the Lighting Division and in 1947 became general manager of the Fixture Division.

During World War II, Mr. Goddard served on several government advisory committees on lighting and on the War Production Board, and represented the lighting fixture industry in the Office of Price Administration. He was national president of the Illuminating Engineering Society in 1949-50. He has written articles on lighting equipment and



Flexible lighting! These two words describe an ever-growing need in industry and elsewhere—a sound reason for you to sell and install BullDog Universal Trol-E-Duct® the year around.

For Universal Trol-E-Duct is the world's most flexible lighting system. In a plant, it permits lighting fixtures to be moved or added in minutes . . . without rewiring, without downtime, without wasted materials. That's because it's every inch an outlet. Connecting a light is simply a matter of inserting a twistout plug or mobile trolley anywhere along the duct. Adding a light, or a hundred lights, is but a matter of attaching them onto the duct where they're needed. Ideal for light duty or portable hand tools, too.

UNIVERSAL

Trol-E-Duct
highlights high profits

Don't overlook *any* of the excellent profit possibilities of BullDog Universal Trol-E-Duct. You'll find it sells to stores, offices, hospitals and schools, as easily as to industrial plants. It's easy to install —makes an ideal indoor job for you during slow winter months.

Universal Trol-E-Duct is available over the counter at your BullDog Distributor's. See him, or write: BullDog Electric Products Company, Detroit 32, Michigan. Ask for Bulletin UT-650.

Export Division: 13 East 40th Street, New York 16, New York. *In Canada:* BullDog Electric Products Company (Canada), Limited, 80 Clayson Road, Toronto 15, Ontario.

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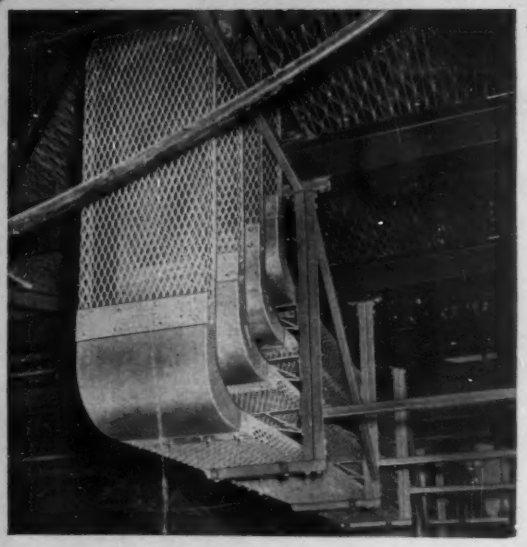
Cope CABLE TROUGH



Etiwanda Steam Station Southern Calif. Edison Co.

for efficient and continuous support of power and control cables

Cope Cable Trough is a completely designed, standard system of flattened expanded metal trough especially designed to give continuous support to power and control circuits. The system is light but strong and can be quickly and easily erected at the job site from completely prefabricated units.

A wide range of fittings such as tees, elbows, dropouts, etc. is available which allows changes of direction and elevation to be easily made.

Installation is extremely simple—the only tools needed are a few wrenches—and once in, the trough, being hot dip galvanized after fabrication, requires practically no maintenance but is accessible should cables ever need to be inspected or replaced.

Write today for further details. Ask for Bulletin 12S.

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Atlanta, Ga.—*The Gearhart Co., P.O. Box 85, North Side Station*
Charlotte 1, N. C.—*Glen & Larson, 123 Brevard Court*
Dallas, Tex.—*I. E. Cope & Co., 1411 Fidelity Union Life Bldg.*
Houston 2, Tex.—*I. E. Cope & Co., 2009 Fannin St.*
Jackson, Miss.—*Gregory-Salisbury & Co., 514 Court St.*
Jacksonville, Fla.—*The Gearhart Co., P.O. Box 5761*
Little Rock, Ark.—*Gregory-Salisbury & Co., 400 Shall St.*
Memphis 12, Tenn.—*Gregory-Salisbury & Co., 2523 Broad Ave.*
New Orleans, La.—*Gregory-Salisbury & Co., 820 Julia St.*
Birmingham, Ala.—*The Gearhart Co., 1727 6th Ave.*

its applications for trade publications and lighting educational courses, and on selling and merchandising subjects for trade magazines.

Daniel Rashall was elevated recently to the position of national sales coordinator for the **Sunbeam Lighting Co.**, Los Angeles, Calif. Mr. Rashall joined Sunbeam in June of this year as sales promotion and public relations director.

Prior to his affiliation with Sunbeam, he was managing director of the Western Lighting Manufacturers Institute and served as public relations consultant to industrial and professional organizations for many years.

W. A. Meyer has been named sales manager of the **Enid Electric Supply Co., Inc.**, Enid, Okla., according to a recent announcement by **V. E. Kufus.** The Enid electrical supply firm is now doing business at their new location—305 West Randolph—and they report increased parking, warehouse, and display facilities.

Walter W. Gibbs, manager of advertising and sales promotion of **General Electric Supply Co.**, Atlanta, Ga., is celebrating his 20th anniversary with G-E.

A native Tennessean, Mr. Gibbs started with the Hotpoint Division of G-E on Oct. 1, 1934. Since then he has been a representative of the company in Miami, Honolulu, Chicago, and, for the second time, Atlanta. He was in Honolulu at the time of the Japs' attack on Dec. 7, 1941.

Thomas W. Martin, chairman, and **L. M. Smith**, president, of **Alabama Power Co.**, Birmingham, Ala., have announced a number of executive advancements and reassignments effective January 1, 1955. They are brought about by the retirement on that date of **E. W. Robinson**, vice-president and general manager, after 31 years of service. At the request of the company, he will be retained as a consultant to the Engineering and Construction Department, especially in the prompt development of the company's projects on the Coosa and the Warrior Rivers.

Two executive vice-presidents have been appointed.

Walter Bouldin, financial vice-president since 1952, a native of Alabama, will become the executive vice-president to whom the Treasury, Sales and Claims Departments will report. Mr. Bouldin, a graduate of the University of Alabama and Harvard Law School, was connected with the law firm of Martin, Turner, Blakey and Bouldin from 1935 to 1952. During this time he was closely

associated with the company's corporate and legal affairs.

H. Neely Henry, who has been vice-president in charge of employee relations since September, 1952, will become the executive vice-president to whom the Employee Relations, Land, Purchasing, Traffic and Office Buildings Departments, and the manager of electric operations will report. Mr. Henry, a native of Alabama, is a graduate of Virginia Military Institute. He has been with Alabama Power since 1924, beginning as offic engineer. He has been district superintendent, district manager, vice-president and manager of the Industrial Development Department and assistant to the general manager.

The newly created post of manager of electric operations will be filled by **R. L. Harris,** who has been manager of production since September, 1951. The Production and the Transmission and Distribution Departments will report to him. He is a native of Alabama and a graduate of the University of Alabama. He began his employment as a tracer in 1923. He has held various assignments in the Construction and Production Departments, including those of results engineer, mechanical engineer and inspector in steam generating plants, and office engineer and superintendent of production.

C. T. Brasfield, Jr., becomes executive engineer. A native of Mississippi, and a graduate of Georgia School of Technology, he was employed as a junior engineer in 1924. He has held the positions of distribution engineer, supervisor of service, superintendent of miscellaneous operations, assistant to the operating manager and assistant to the general manager.

J. A. Keene, who has been superintendent of production since September, 1951, will succeed Mr. Harris as manager of production. Mr. Keene is a native of Georgia, has a BS degree in engineering from Georgia School of Technology and an MS degree in mechanical engineering from Yale University. He joined Alabama Power in 1943 as assistant superintendent of production after extensive experience in steam generating plants elsewhere.

A. E. Burnett, a native of Alabama, advances to the post of manager-employee relations. He has been superintendent of Gorgas Steam Plants for the past six years. An engineering graduate of Alabama Polytechnic Institute, he began his employment with the company in 1930 as a junior engineer. He has been a lineman, local and district manager, division, office and senior engineer. In 1940 he received an Alfred P. Sloan Fellowship for advanced study in economics and industrial administration at Massachusetts Institute of Technology.

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Hold it...

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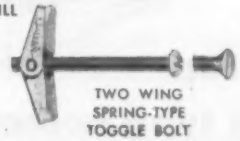
ANCHORING and DRILLING DEVICES

Always Specify ARRO

ARROFLUTE CARBIDE MASONRY DRILL

LAG SCREW EXPANSION SHIELD



TWO WING SPRING-TYPE TOGGLE BOLT

A-C-E EXPANSION SHIELD

SPRING HEAD STEEL TOGGLE BOLT

DOUBLE EXPANSION SHIELD

RIVETED HEAD TOGGLE BOLT

O-E EXPANSION SHIELD

LITTLE MAJOR TURNBUCKLE

MACHINE SCREW ANCHOR

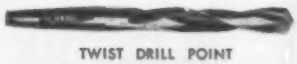
FOUR-POINT HAND STAR DRILL

STUD BOLT ANCHOR

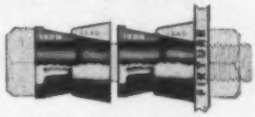
THREE-POINT DRILL POINT

FOUR-POINT DRILL POINT

LEAD SCREW ANCHOR



TWIST DRILL POINT



MAL-LEAD BOLT ANCHOR

RUBBERGRIP DRILL POINT HOLDER

See your industrial, hardware or electrical supplier

ARRO EXPANSION BOLT COMPANY

1520 Boone Ave., Marion, Ohio

Porcelain Products' service mast KIT

Everything furnished

but the house and conduit

for

Ranch type homes

Available Now!—a Service Entrance Mast kit complete to every detail—including roof flashing. Even necessary bolts, nuts, lag screws, and nails. These articles make up the new Porcelain Products' service mast kit that you'll put up and forget. All components of the kit can be *installed by an electrician, with electricians' tools.*

Here is a list of the parts:

- ✓ 1¼" UL approved Service Entrance Cap
- ✓ 1¼" to 2" Bell Reducer to adapt service cap to conduit
- ✓ Galvanized Roof Flashing and Storm Collar
- ✓ Roof Mounting Plate of new and original design
- ✓ Conduit hanger with 2¼" lag screw attached
- ✓ Slip-fitting offset reducer with interior grounding device
- ✓ All necessary bolts, nuts, lag screws and nails
- ✓ *Plus*—Porcelain Products famous 2061-C Pipe Mounting house brackets as specified.

Write for details today!

60 years **Porcelain Products, Inc.** **PP INC.**
FINDLAY, OHIO

William S. Ginn, formerly of Atlanta, has been named general manager of the **General Electric Company's Transformer Division** at Pittsfield, Mass., the company announced recently. Mr. Ginn, a 1936 graduate of Georgia Tech, succeeds **Francis S. Fairman, Jr.**, who is retiring because of ill health.

Mr. Ginn is the son of E. H. Ginn, who retired in 1946 as Southeastern

William S. Ginn

District commercial vice-president for General Electric after 46 years of service with the company in Atlanta.

The younger Mr. Ginn entered G-E's Engineers Training Program after his graduation from Georgia Tech.

He has been associated with the Transformer Division at Pittsfield since 1938 except for service in the U. S. Navy from 1941 to 1945.

N. P. Heath, executive vice-president of **Southwestern Gas and Electric Co.**, Shreveport, La., has been named chairman of the executive committee of the board of directors of the company. The committee was formed at the November meeting of the board. Other members of the committee are **Frank M. Wilkes**, chairman of the board; **J. Robert Welsh**, president; **E. F. Graham**, vice-president and **H. W. Pirkey**, controller. **S. M. Sharp**, vice-president and chief engineer, has been named a member of the board, succeeding **Marshall Walker**, who is retiring to become an honorary member.

E. A. Williams has been appointed manager of the **Eastern Switchgear Division of Federal Pacific Electric Co.**, Newark, N. J., was announced recently by **Thomas M. Cole**, executive vice-president.

Mr. Williams will have headquarters at Federal Pacific's new switchgear plant in Scranton, Pa.

Mr. Williams was associated with the Railway and Industrial Engineering Co., as chief engineer in charge of design, development and application of commercial and plant engi-

neering, from 1951 until his present appointment.

Before joining Railway and Industrial Engineering, Mr. Williams served in various capacities with General Electric. His service with G-E included positions as administrative assistant to the vice-president of the General Electric X-Ray Corp., Milwaukee, assistant manager of the General Electric engineering panel and equipment division in Philadelphia, chief engineer of the General Electric switchgear device division, and design engineer of the power fuses product line.

Mr. Williams is a graduate of Virginia Polytechnic Institute.

Rye Wholesale Co., North Little Rock, Ark., has announced the appointment of **Stanley K. Bradshaw, Jr.**, as sales promotion manager. Mr. Bradshaw attended the University of

S. K. Bradshaw, Jr.

Arkansas, and upon his graduation in June, 1952, was commissioned in the U. S. Air Force. He comes to Rye directly from his Air Force assignment.

Rye is the wholesale distributor for a number of well known electrical supply and appliance lines in the Arkansas territory.

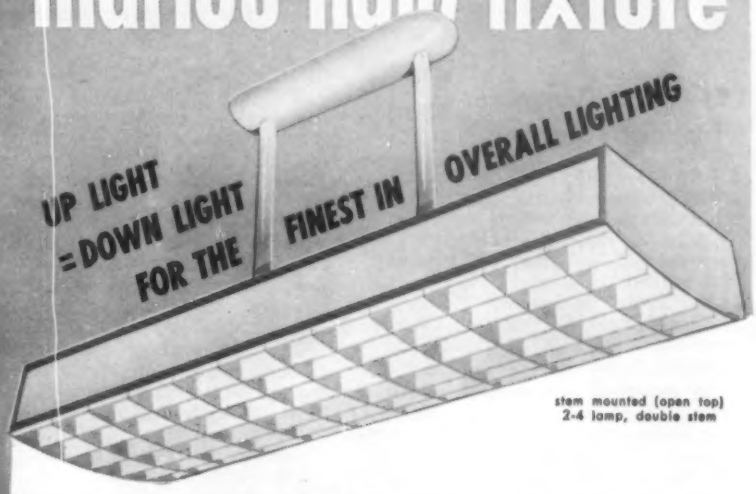
Chester C. Boesewetter has been appointed chief engineer of **Penn-Union Electric Corp.**, Erie, Pa., manufacturer of a complete line of conductor fittings. He will supervise all of the company's engineering activities, in addition to directing the development of new products, and construction of new and enlarged testing laboratory facilities.

Mr. Boesewetter, who is an engineering graduate of the Milwaukee School of Engineering and the University of Wisconsin, recently was with the Goodman Manufacturing Co., manufacturer of electrical mining machinery.

He is a member of the American Institute of Electrical Engineers, the American Mining Congress, and a registered professional engineer.

marlou halo fixture

UP LIGHT = DOWN LIGHT FOR THE FINEST IN OVERALL LIGHTING



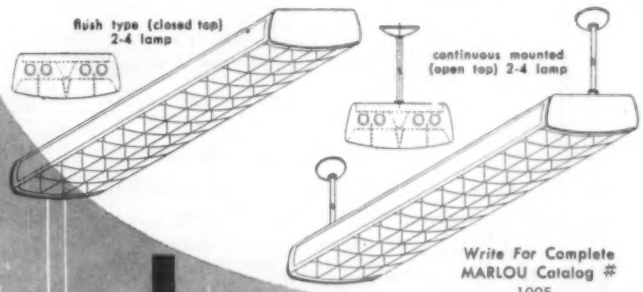
stem mounted (open top) 2-4 lamp, double stem

The MARLOU "Halo" louvred ceiling fixture is recognized by the government, prominent architects and engineers, when stem mounted, as producing the finest overall illumination. It corresponds to Federal #362 to #365 series, and due to its unique engineering design up light almost equals down light. *Result*—the very finest, diffused even light from one of America's best designed fixtures.

Complete installation of the MARLOU "Halo" Fixtures are being made in the Justice Department, Post Offices and many other Government departments.

Specify the "Halo" Fixture for your Job.

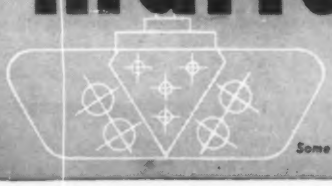
"Above All Else...MARLOU is Quality Lighting"



Write For Complete MARLOU Catalog # 1005

marlou lights, inc.

A complete line of lighting fixtures for Fluorescent, Slimline and Cold Cathode Lights.



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Some select territories open to recognized Manufacturers Agents

Technical books

for the electrical man

Electrical Conductor Technical Manual

An illustrated book prepared by the Technical Writing Dept., Kaiser Aluminum & Chemical Sales, Inc., 190 pages. Book is available without cost if requested on company letterhead; otherwise a charge of $2 is made. Order from Technical Editor, Kaiser Aluminum & Chemical Sales, Inc., 228 N. LaSalle St., Chicago 1, Ill.

A practical, comprehensive reference book on aluminum electrical conductor, prepared and published by the technical department of Kaiser Aluminum & Chemical Sales, Inc., in cooperation with the company's electrical conductor engineering and research staffs.

The 190-page, illustrated volume, entitled "Kaiser Aluminum Electrical Conductor Technical Manual," is designed as a basic guide for use in engineering aluminum conductor installations.

The new book provides: Data on the physical properties and electrical characteristics of all sizes and strandings of aluminum conductor; The latest information on the application of aluminum to overhead distribution systems; and a basis for the calculation of all data accumulated, together with the present specifications that govern the manufacture of Kaiser Aluminum electrical conductor.

Throughout the book, basic engineering data are presented to enable the user, by simple calculations, to easily evaluate the essential design information and thereby determine what is necessary for a specific job.

As an added feature approximately 72 pages of industry specifications have been reproduced for ready reference.

Scope of the book has been made sufficiently broad to interest all persons actively engaged in the distribution and transmission of electrical power. In general, utilities managers, overhead engineers, purchasing agents, consulting engineers, electrical contractors, construction personnel and such users of conductor as railroads, mining companies and refineries should find the book of practical value. With the information presented, it becomes an easy matter to determine the exact size and stranding of aluminum conductor for any application.

Special attention has been paid to the design of the book to enable the reader to find desired data rapidly. It is sectionalized, with a comprehensive table of contents; text and tables are presented in easy-to-read type.

Electric Transmission and Distribution

Edited by Bernhardt G. A. Skrotski, McGraw-Hill Book Co., 330 W. 42nd St., New York 36, N. Y., $7.50.

This volume starts with an outline of a-c and d-c theory basic to design of practical equipment. Subsequent chapters describe equipment used in transmission and distribution of electric energy from generating station to consumer.

Subjects discussed include overhead and underground circuits; high and low voltage circuits; capacitors and transformers; auxiliaries; protection against short circuits and lightning; and street lighting.

Descriptions are developed in such a way as to give a general idea of actual layout of equipment and what it does in the utility system.

Insulating Materials Temperature Stability

Special Technical Publication No. 161, the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 141 pages, heavy paper cover, $2.75.

Insulating materials have for years been divided into several temperature classes based to a large extent on a broad definition of their composition; that is, organic, inorganic, combinations of organic and inorganic, etc. Service experience has served generally to confirm the classifications and to establish the suggested temperature limits for each class. In view of the rapid development of new insulating materials in recent years, it has become increasingly apparent that test methods and standards are necessary as guides for determining the thermal stability of insulating materials. This

AIR-FLO MODEL 610
AUTOMATIC CEILING SHUTTER
Outstanding Features of Model 610 Automatic Ceiling Shutter
• Neutral Aluminum Color Blends With Any Decoration and Color Scheme
• Flush Appearance
• One Continuous Panel Regardless of Width
• Maximum Free Air Opening
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ASTM Symposium on Temperature Stability of Electrical Insulating Materials is an important part of such effort.

Sponsored by ASTM Committee D-9 on Electrical Insulating Materials, this Symposium was presented at the 57th Annual Meeting of the American Society for Testing Materials held in Chicago last summer.

The publication contains some 11 papers on insulating materials by well known people in the testing materials field. It is well illustrated with photographs, tables, and charts.

Hot Sticks

By O. G. Anderson, D. C. Hubbard, and H. A. Houston, Advertising Department, A. B. Chance Co., Centralia, Mo., 162 *pages,* $2.50.

This is a complete descriptive manual on high voltage line maintenance written by O. G. Anderson, hot line tool specialist; D. C. Hubbard, chief engineer of hot line tools; and H. A. Houston, advertising and sales promotion manager, all of the A. B. Chance Co. Many suggestions were contributed by men throughout the electrical industry for the format and contents of the manual.

The 162 page book contains sections on care of hot line tools, training hot stick crews, operation of principal hot line jobs, and 21 basic hot line tool jobs with a step-by-step procedure.

These jobs include insulator, cross arm and pole changes on straight line, dead end, running corner and suspension construction. Voltage ratings of the job procedures range from five kv up to 287 kv. All jobs are completely illustrated so that the job steps can also be followed pictorially.

Electric System Operation

Edited by G. A. Skrotski, McGraw-Hill Book Co., 330 *W.* 42*nd St., New York* 36, *N. Y.,* 370 *pages,* $6.50.

This volume describes in detail the operation of generating, transmitting, and distributing equipment, covering the major problems in running an electric system to realize the full benefits of safety, reliability, and economy.

The electric utility system is reviewed from the fuel input and water flow to the customer's connections. Chapters also cover information on relays, load dispatching and control, system communications, operating costs, and rate schedules.

"Personally, I like 'em built to my own specifications"

And Speaking of Light Fixtures...

Light & Power fluorescent fixtures are made in our own plant from start to finish . . . not merely assembled. That's why we're uniquely equipped to build light fixtures exactly to **your own** particular specifications.

For all the advantages of "custom-made" fixtures at the cost of standard ones, wire or write today for our catalog and prices. **Distributed by Electrical Wholesalers Only.**

LIGHT & POWER UTILITIES CORP.

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TRIPLOC Plugs and Receptacles

1, 2, 3, 4, 6, 8 and 12 pole interchangeable and reversible contact units.

An Exceptionally Versatile Line in the Heavy Duty Field

An exceptionally versatile line, unequalled in the heavy duty field, with a virtually unlimited number of assembly combinations to meet the individual requirements of *any* portable electrical equipment.

Interchangeable contacts, 1 to 8 poles, can be assembled in standard plug shells and receptacle housings. The protected female contact unit can be assembled in either plug or receptacle for safety in the line side of the circuit. Fusible types and units with one pole grounded are also available.

Automatic bayonet lock with either manual or combination manual and automatic release protects equipment and wiring. Wide range of pressed steel plug shells, receptacles, and cord connectors available in the complete Triploc line, including cast metal housings threaded for watertight gasket seal. Ratings up to 20 amperes, 250 volts DC, 460 AC. Consult your Pylet Catalog 1100, Bul. 1140-1, for complete listings.

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THE PYLE-NATIONAL COMPANY

1354 N. Kostner Avenue, Chicago 51, Illinois

Free bulletins

available to our readers

Ten catalog sections of **lighting equipment** for 1955 have been issued by the **F. W. Wakefield Brass Co.**, Vermilion, Ohio. The sections were designed for brevity in copy and simplicity in drawings and tables and cover all segments of the Wakefield line: Sigma, Beta, Omega, Wakefield Ceiling, Cavalier, Grenadier, Pacemaker, Star, Commodore, and Industrial. Individual catalog sections or the complete set of 10 are available.

For your free copy, circle number B1201 *on the coupon on page* 75.

The largest style book in their history, a **Golden Anniversary Catalog**, has been published by **Lightolier**, 11 East 36th St., New York, N. Y. It contains more new lighting designs than any previous Lightolier catalog, and is 9 by 12 inches in size, 96 colorful pages. Some 317 individual lighting designs are presented in these pages, grouped according to their ultimate placement — living room, dining room, bedroom, kitchen, bath, utility room, and the garden.

For your free copy, circle number B1202 *on the coupon on page* 75.

A new booklet on office lighting, **"Good Lighting is Good Business,"** has been released by **Sylvania Electric Products, Inc.**, 1740 Broadway, New York 19, N. Y. Written by two Sylvania lighting engineers with extensive experience in this field, George Clark and Robert R. Wylie, the booklet is a factual treatise covering the economics and mechanics of good office lighting.

Written in non-technical language, the book covers such topics as layout and planning, maintenance, room finishes and color, quantity of light, fluorescent vs. incandescent, light distribution, natural lighting, and various lighting systems. Also included is a section on recommendations for lighting areas other than general offices. Included are private offices, conference rooms, drafting rooms, reception areas, mail and filing rooms, corridors and hallways, and wash rooms.

For your free copy, circle number B1203 *on the coupon on page* 75.

A completely new **General Electric Flamenol wire and cable bulletin** has been announced by the company's Wire and Cable Department, Bridgeport 2, Conn.

This new bulletin contains application, product, and technical information on Flamenol wire and cable for machine tool, appliance, traffic-control, station-control and electric equipment applications as well as similar information on G-E wire and cable for other applications such as Geotrol gasoline- and oil-resistant wire, Flamenol bus-drop cable, neon sign cable, and audio drive-in theater cable.

The product and specification data contained in this publication is intended for use by electrical contractors, plant electrical engineers, and product designers.

Publication number of the bulletin is 19-354 and it is available without charge from the Construction Materials Division at Bridgeport.

For your free copy, circle number B1204 *on the coupon on page* 75.

New Folder 1060 describes a new line of **Air-Break Electric Starters** for 2200-5000 volt motors by the **Electric Controller & Mfg. Co.**, 2700 East 79th St., Cleveland, Ohio.

The folder illustrates starters using the EC&M type ZHA 50,000 kva Air-Break Contactor. For circuits of higher Fault Capability, these starters are built with Current-limiting Power Fuses, and in Valimitor style (volt-ampere-limitor) in which air-core reactors limit infinite kva to a finite value easily cleared by the 50,000 kva contactor.

Many sectional and complete views of each type are detailed and described along with reproductions of certificates of short circuit tests.

For your free copy, circle number B1205 *on the coupon on page* 75.

Two new bulletins have been announced by **USCO Power Equipment Corp.**, 829 North 36th Way, Birmingham 4, Ala. Bulletin CF-1R deals with USCO Type CF-1R **Cutouts**, and Bulletin GT-100 covers the USCO line of **vertical break-high pressure contact switches.** Either or both of these bulletins are available upon request.

For your free copy, circle number B1206 *on the coupon on page* 75.

The Okonite Co., Passaic, N. J., has announced publication of **Bulletin OK-1085**, the complete story on Okolite-Okoprene 0 to 5000 volt unshielded, rubber-insulated, neoprene-sheathed cable. As this is the cable type most commonly used by industrial and utility plants for low voltage power and control circuits, the current carrying capacity tables, short circuit curves, voltage regulation formulas, and methods for determining conduit sizes, pulling tension and bending radii should

prove extremely useful to electrical engineers. Also, a thorough discussion on the advantages of cables that do not require shielding for 4160 volt operation is included.

The bulletin is clearly written, and includes four main sections: construction features, engineering information, installation and handling techniques, splicing and terminating procedures.

For your free copy, circle number B1207 *on the coupon on page* 75.

A comprehensive illustrated price list—catalog of the latest designs in **recessed lighting,** utilizing Holophane Controlenses, has been announced as available from the **Marvin Manufacturing Co.,** 1826 N. Sheffield Ave., Chicago, Ill. The catalog gives complete descriptive information and prices on the Marco line of Holophane equipped recessed lighting fixtures. It is well illustrated.

For your free copy, circle number B1208 *on the coupon on page* 75.

A new 16-page engineering manual, Bulletin No. 133, for **Uptegraff Power Transformers** has been published by **R. E. Uptegraff Manufacturing Co.,** Scottdale, Pa. The manual provides detailed physical and electrical characteristics for liquid-filled, single and three phase transformers from 750 through 10,000 kva.

Sections are included on standard accessories, performance data, dimensions and weight, base dimensions, terminal arrangements and optional accessories.

For your free copy, circle number B1209 *on the coupon on page* 75.

New catalog, **"Wiremold Fluorescent Lighting Fixtures and Fittings,"** Form 578, has just been released by the **Wiremold Co.,** Hartford 10, Conn.

Fully illustrating and describing the company's four series of fluorescent and slimline units, this catalog also presents suggested applications.

For your free copy, circle number B1210 *on the coupon on page* 75.

A new publication entitled **"Clean Waters — And How To Get It"** has been announced as available from the **General Electric Co.,** Schenectady 5, N. Y.

The two-color, 34-page bulletin, designated GEA-6096, is designed to help civic leaders, municipal officials, and sewage treatment experts dramatize to their communities the urgency of providing proper sewage treatment and how to get it.

It contains facts on water pollution, a four-step course of community action to fight pollution, examples of successful municipal campaigns, and methods of maintaining public support for such programs.

For your free copy, circle number B1211 *on the coupon on page* 75.

Can't rust out!

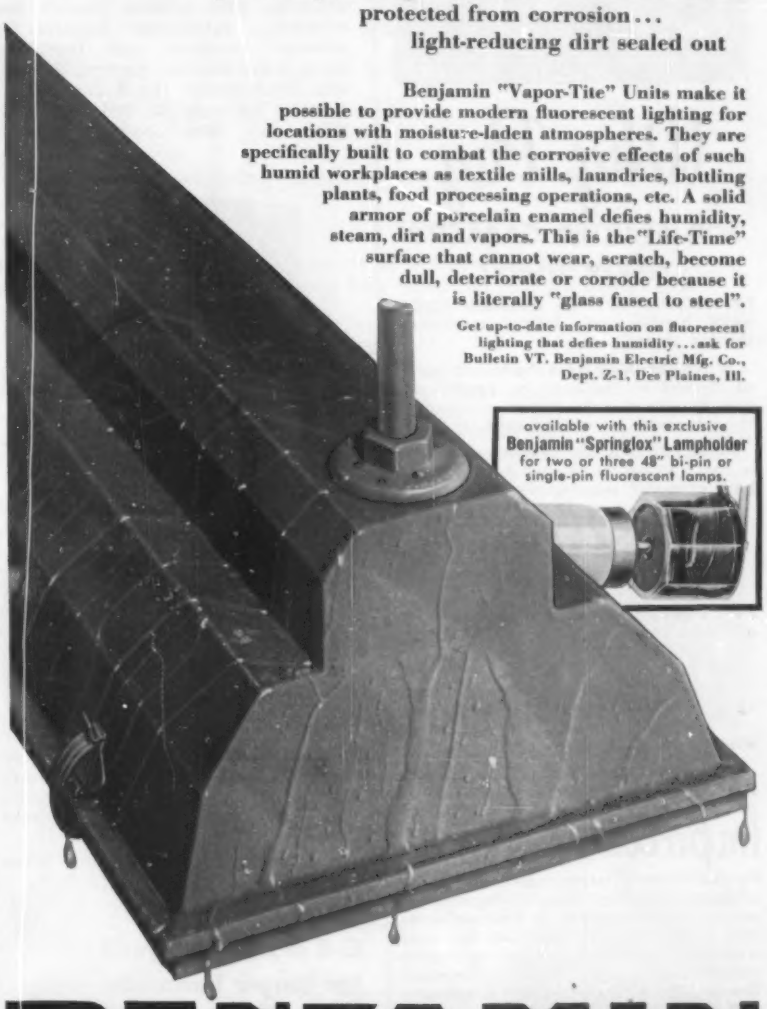
no cracks or crevices... no place for rust to get a foothold... seamless, one-piece housing with unbroken surface of "Life-Time" Porcelain Enamel!

No service breaks due to humidity!

poor lamp-starting eliminated... electric contacts protected from corrosion... light-reducing dirt sealed out

Benjamin "Vapor-Tite" Units make it possible to provide modern fluorescent lighting for locations with moisture-laden atmospheres. They are specifically built to combat the corrosive effects of such humid workplaces as textile mills, laundries, bottling plants, food processing operations, etc. A solid armor of porcelain enamel defies humidity, steam, dirt and vapors. This is the "Life-Time" surface that cannot wear, scratch, become dull, deteriorate or corrode because it is literally "glass fused to steel".

Get up-to-date information on fluorescent lighting that defies humidity... ask for Bulletin VT. Benjamin Electric Mfg. Co., Dept. Z-1, Des Plaines, Ill.


available with this exclusive
Benjamin "Springlox" Lampholder
for two or three 48" bi-pin or
single-pin fluorescent lamps.

BENJAMIN
TRADE MARK

"VAPOR-TITE"

Sold exclusively through electrical distributors

A Product of Benjamin Electric Mfg. Co.
makers of famous Benjamin and Leader Line lighting equipment and Sound Signals for Industry, Institutions and Commerce.

Why Pay

FOR STARTER CAPACITY NEVER USED?

THE ANSWER TO THIS QUESTION COULD SAVE hard-earned dollars needlessly thrown away.

When choosing from the widest range of starters in the 1-50 hp range, you save by selecting the starter matched to the job—with no wasted capacity.

Furnas Electric starters—nine of them in the 1-50 hp range—are designed and built to match most applications.

Save 25% TODAY LIKE THIS

Here's an example of typical savings you can earn through proper starter selection: for 10 hp service, for example, you'd select Furnas Electric Type YE rated for the job. This saves you up to 25% on initial costs and 40% on space over a YF size 2 (rated 25 hp) normally selected for 10 hp service.

All of the nine Furnas Electric sizes offer worthwhile savings.

Important FEATURES

Furnas Electric starters give you these additional benefits. *Dual Voltage Coils*—matched to motor voltage. *Thermal Overload Protection. Shallow Case* for easy wiring. *Durability* to stand up under rough service. *Arc Resistant Terminal Board. Arc Quenching Silver Contacts.*

Complete RANGE OF OTHER PRODUCTS

Pressure switches for air and water applications. Drum controllers for reversing, multi-speed and reversing multi-speed service.

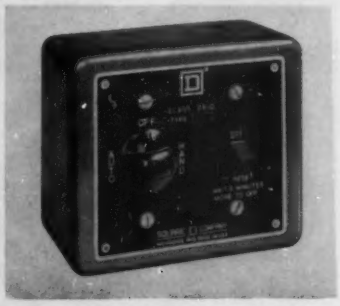
FURNAS ELECTRIC
Batavia, Illinois

New products

(For more information, use coupon on page 75)

Square D Auto-Off-Hand permits remote control

THE RAPIDLY EXPANDING air conditioning and heating market has created a substantial demand for selector switches and fractional horsepower manual starters. To meet this requirement, the Square D Co., 4041 N. Richards St., Milwaukee 12, Wis., has introduced a selector



switch and fractional horsepower manual starter in a single, compact, diecast enclosure.

Installation costs are reduced because there is only a single device to be mounted and wired. The "Auto-Off-Hand" selector switch permits remote control from a thermostat, or local control from the starter. The manual starter provides motor overload protection.

Two manual starters, without the selector switch, are also available in the same enclosure. Maximum ratings are 1-hp at 115 or 230 volts single phase a-c, or 115 or 230 volts d-c.

For additional data, circle item 1212 on the coupon on page 75.

G-E starter designed for longer lamp life

A NEW STARTER designed to give longer average life to regular 40-watt fluorescent lamps has been announced by General Electric's Construction Materials Division, Bridgeport 2, Conn.

The new starter contains a glow switch entirely different from previous types. This glow switch, which was developed by G-E's Lamp Development Laboratory at Nela Park, Cleveland, prevents the voltage surges which are sufficient to cause instant starting of lead-circuit lamps thus shortening lamp life.

Most 40-watt lamps are operated from a lead-lag type of two-lamp ballast. For some time it has been known that the life of the "lead-circuit" lamp was considerably less than the "lag-circuit" lamp under average conditions. Investigations showed that this decrease life often resulted from instant starting of the lead-circuit lamp even though the ballast and starter installed in the fixture were designed to provide a pre-heat interval. In effect, the new switch assures proper pre-heating time for lead-circuit lamps and prolongs lamp life.

The new glow switch starter for 40-watt lamps has been designated as the FS-400 Watch Dog starter.

For additional data, circle item 1213 on the coupon on page 75.

Sylvania light bulb designed for reading

A NEW LIGHT BULB designed specifically for reading has been announced by Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y. A special, long-lasting, smoothly applied coating results in improved light diffusion and softens harsh shadows.

Designated by Sylvania as the A25 Reading Lite, the new bulb is expected to find a ready market among housewives.

The special coating also serves to eliminate the 'hot spot' found in ordinary bulbs, by distributing light more evenly over the entire lamp. This 'homogenized' bulb brightness reduces glare and helps to provide a more comfortable visual environment, giving just the right light for reading, studying and sewing.

The Reading Lite is a small 150 watt bulb and fits easily into nearly any reading lamp. For easy identification by both customer and sales clerk, the words "Reading Lite" are etched on the end of the bulb. This is repeated on all four sides of the black and yellow sleeve.

For additional data, circle item 1214 on the coupon on page 75.

Peak-Trol is automatic off-peak load control

DESIGNED FOR AUTOMATIC off-peak load control, Peak-Trol has been announced by Control Corp., 718 Central Ave., Minneapolis, Minn. The Peak-Trol system being automatic, eliminates the use of old fashioned time-clocks, helps the power company to cut peak loads, and fill in the valleys which in turn improves the power factor and brings about large savings.

ELECTRICAL SOUTH
806 Peachtree St., N.E.
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DECEMBER, 1954

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B1206	1212	1218	

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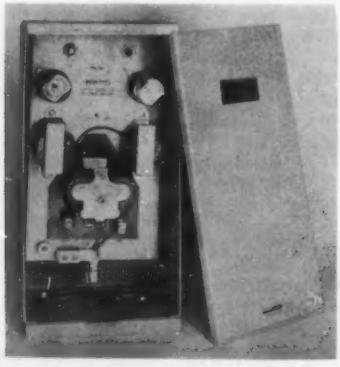
FOR MORE INFORMATION — Use this handy return coupon for requesting manufacturers bulletins or additional information on new products listed in these pages. Be sure to give firm name and your position or title.

By employing a signal transmitter at the substation and a small receiver at the water heater location, the system is ready for automatic operation. Normally, no signal is transmitted on the power line. All equipment at rest except the watt meter load detector. This load detector has two adjustable limit settings. When the load goes above the upper setting, the transmitter is turned on and sends out a signal



over the power line which automatically turns off all water heaters. When the load goes below the lower setting, the transmitter sends out another signal and the water heaters are automatically turned on again.

The Peak-Trol signal is formed by a 360 cycle sine wave which is fed into the power system. For "off" operation, this signal is fed at such a phase angle with respect to the power voltage wave, that it will add slightly to one-half of the power voltage wave (for example, the positive half) and subtract slightly from the other half of the power voltage wave (the negative half). This creates a slight difference between the two halves of the voltage wave which is detected by the receiver at the water heater, and current is turned "off."

For "on" operation, another signal is sent out and the receiver at the water heater automatically turns the current on.

The transmitter located at each substation is a simple motor generator. The low power Peak-Trol sig-

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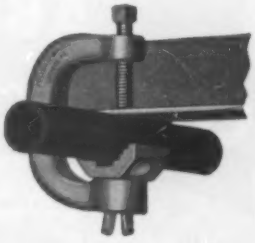
FLOOR BOXES • WIRING SPECIALTIES

"Latrobe" Floor Boxes and Wiring Specialties offer real economy in installation and replacement costs. Their unique design, free of unnecessary parts, mean quicker installation and longer service.

Adjustable Watertight Floor Boxes
All adjustable boxes are now equipped with a positive bond which makes them completely fire-proof.

Pipe or Conduit Hanger
The most economical and best pipe hanger sold today—rust-proof.
For hanging pipe ½" to 1½" thick to steel beams ⅜" thick.



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nal has such a slight effect upon the system voltage, it ordinarily can be detected only by the receiver at the water heater location. The receiver unit is a simple vacuum tube amplifier. There are no sensitive relays used. The only moving part is a heavy-duty load relay which shuts off or turns on the current.

Primarily designed for automatic control of water heaters, the system is ideal for any off-peak load control. The manufacturer claims that Peak-Trol can operate over practically any distance and will control practically an unlimited number of water heaters.

The transmitter is equipped for manual operation in the event of an emergency. The transmitter is also designed so water heaters may be picked up in small groups if desired.

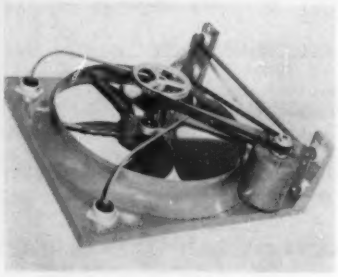
For additional data, circle item 1215 *on the coupon on page* 75.

McLean announces small home attic fan

PRODUCTION of a new type fan for small ranch type homes, to be known as the McLean VT-20 Vertical Discharge Attic Fan, has been announced by the McLean Engineering Laboratories, P. O. Box 531, Princeton, N. J.

This fan is designed especially for the ranch style home having ceiling joists on 24-inch centers. The VT-20 fan and the 20-inch by 27-inch ceiling shutters can be installed in these homes without cutting a ceiling joist.

The VT-20 fan is precision engineered for extremely quiet operation. All moving parts are sound proofed and each fan features rubber mounted main bearing and motor, flexible steel frame, and soft rubber, built-in, vibration absorbers.

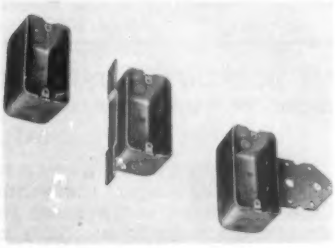


The McLean fan also features Torrington fan blades, long hour duty motor with sleeve bearings for quiet operation and automatic overload protection, pulleys that are machined and precisely balanced, deep drawn steel orifice for maximum air flow, isolated from frame for quietest operation, and main bearings that are permanently lubricated ball bearings.

For additional data, circle item 1216 *on the coupon on page* 75.

Keystone Handy Boxes have mounting brackets

KEYSTONE HANDY BOXES are now available with brackets specially designed for either face or side mounting to studs, according to a recent announcement by the manufacturer, Keystone Manufacturing Co., 23328 Sherwood Ave., Center Line, Mich. Type "B" brackets are suitable for mounting on the face of the stud, while Type "V" are mounted on the side of the stud.



The brackets are stamped from heavy gauge sheet steel, and are securely welded to the side of the box. Two lanced nailing points, in addition to adequate nail holes, are provided for "double quick" installation.

Specially designed knockout dies assure fast, free knockout removal from the boxes, although the knockouts are securely attached. Nine Handy Boxes are available with various knockout and bracket arrangements.

For additional data, circle item 1217 *on the coupon on page* 75.

Pocket-size caliper announced by Burndy

A POCKET-SIZE stainless steel caliper for direct reading of electrical conductor sizes has been developed and marketed by Burndy Engineering Co., Inc., Norwalk, Conn. Called the "Wire-Mike," this new instrument gives direct size readings of Stranded Commercial Cable from No. 18 through 2000 Mcm., Solid Wire (AWG) from No. 20 through 4/0; ACSR from No. 6 through 336.4 Mcm., rigid conduit and copper pipe from ¼ inch through 2½ inch, and thinwall conduit from ⅜ inch through 2 inch.

In addition, the Wire-Mike is an inside and outside caliper in 32nds inches and a 3½ inch rule. Included is a handy conversion table of pipe sizes to inside dimensions.

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No. 200 Service Entrance and Range Connector for ¾" K. O.

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Constructed of heavy-gauge stainless steel, weighing two ounces, with an overall length (closed) of 4½ inches, and provided with a genuine leather slip case, the Wire-Mike, $1.95, is a lifetime tool for the desk, pocket, or kit of anyone working with wire.

For additional data, circle item 1218 *on the coupon on page* 75.

Bryant switching system operates on low voltage

A MODERN METHOD of controlling electrical circuits called Multi-Control, has been announced by the Bryant Electric Co., Box D, Barnum Station, Bridgeport 2, Conn. Through the use of small relays, which are actuated by low voltage switches, lighting and appliance circuits may

be controlled from one or any number of desired locations. Another outstanding feature, not available in conventional wiring systems, is the Master Switch Control. One or more Master Switches may be installed at strategic locations for the control of any number of circuits.

Because this switching system operates on low voltage, it is safer and the use of less costly switching conductors is achieved. Aside from the economy of installation, this system provides the flexibility and versatility not afforded with conventional switching systems.

Multi-Control may be used as an entirely new system or to supplement existing wiring.

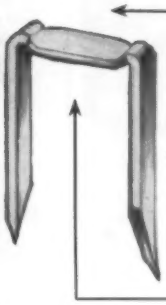
For additional data, circle item 1219 *on the coupon on page* 75.

Entire connector line installed with one tool

A COMPLETE LINE of compression-applied distribution and service connectors was introduced recently by the Thomas & Betts Co., 36 Butler St., Elizabeth 1, N. J., together with an unusual, new hand tool for installing them. Based on the same principles as T&B Method transmission connectors, the new line features a square-shaped compression for all joints including those for the steel core wire of A.C.S.R. (Aluminum Cable Steel Reinforced.)

The entire, new connector line is installed with the new UT-5 tool, which weighs only five pounds. Range of conductors accommodated

NOB-STAPLES



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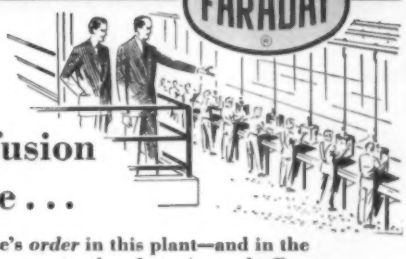
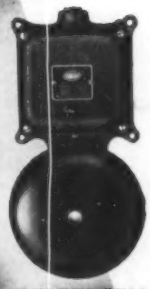
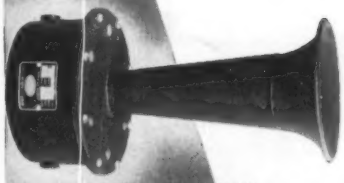


No Confusion here . . .



NECK-TYPE BELLS



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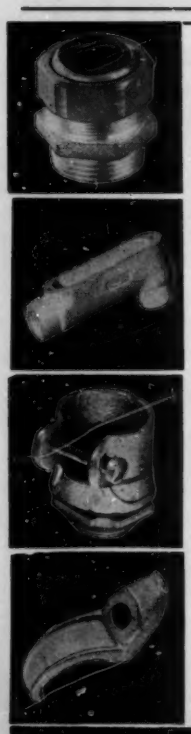

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The UT-5 tool covers a conductor range that ordinarily would require several tools, says the company. This is made possible by supplying with the new tool three quickly interchangeable die blocks, each containing four installing grooves; the lower die is fixed and mates with any interchangeable die block.

For additional data, circle item 1220 *on the coupon on page* 75.

National redesigns octagon cable box

A NEWLY DESIGNED four-inch octagon cable box with a new style clamp and integral ears for "loom-wire" non-metallic sheathed cable has been introduced by National Electric Products Corp., Gateway Center, Pittsburgh, Pa.

Designated as catalog Number 2761, the new outlet box is formed of full 14 gauge steel, electrogalvanized finish, is one and one-half inches deep, and has ½-inch knock-out and four holes in back for fixture stud and nailing.

Priouts on the Number 2761 box take cable sizes 14/2, 14/3, 12/2, and 12/3. In addition the sides have 2½-inch knock-outs. All knock-outs are flush and smooth and are easily removed. Specially designed NT clamps grip cables firmly in the Rededge Number 2761 box. Cables enter from side or rear in such a position that they are kept free of the edges of the knock-outs.

The two-piece formed steel box has a slightly recessed back which gives a little when it is nailed to keep a constant tension against the underside of the nailhead. This holds the box tightly and permanently flat against joist or wall. The flat bottom cannot rock. The square corners resulting from this design provide more finger room. It is said to be stronger than drawn box design.

Box 2761, listed by Underwriters Laboratories, Inc., is available also with ears, side bracket or bar hanger mounting.

For additional data, circle item 1221 *on the coupon on page* 75.

Radiant heating

(*Continued from page* 27)

to the insulation that serves the heating system in winter.

7. There is no waste space on walls or floors which means extra space and unlimited freedom in placing and arranging furniture.

8. The electric radiant heat is safe from burns, fire, and explosions.

9. Home owners, once accustomed to the even distribution of heat, warm floors and furnishings, freedom from dust, drafts and fumes, really become sold on the new heat and consequently resale value of homes stays high.

Design freedom

Architects are now specifying electric heating and like the freedom of design it permits. Mr. Landers finds that his reputation in electric radiant heating helps sell the wiring jobs (it all goes under one contract) and brings business that might otherwise be lost or which might be unprofitable because of competition. He has found that electric radiant heat got him several tourist court jobs and has enabled him to get jobs in nearby towns at a profit. The remodeling and conversion of older residences is a field of considerable promise that is hardly touched.

Mr. Landers has now pioneered his first job in acoustical luminous ceilings by installing one for Frazier Machine & Supply Co., local electric distributor who also handles his heating line for the North Alabama territory.

Regulators on rural lines

(*Continued from page* 40)

mate regulator location. It can be assumed that the resulting increase in voltage drop will be in proportion to the estimated increase in load current. After sketching in the profile of the anticipated future peak load voltage in a manner similar to that shown in Figure 5, the point of installation of the regulator will have been established as that point at which the new curve crosses the point of minimum permissible voltage.

If the voltage profile falls below the point of minimum permissible voltage at another more distant point on the line, an additional regulator or other corrective measures will be necessary.

When checking voltages for a voltage study there are several considerations that should be kept in mind. First, it is most important that all instruments be properly calibrated. A difference of two volts between the readings of two different instruments is not uncommon and is normally not very important when making the usual 120 volt readings. But, when making voltage profiles, the concern is with voltage drop. This same two-

volt difference out of a 10-volt drop represents a 20% error.

It is best to use recording voltmeters for these studies with all charts made under similar load conditions. If this is not practical, charts may be made at a few strategic locations to determine the time of peak load. Indicating voltmeter readings can then be taken under similar load conditions at the remaining locations.

It is generally known that recording voltmeter charts should not be taken at a customer's service, as transformer and secondary drop caused by customer loads will give erroneous readings. However, indicating voltmeter readings can be taken at a customer's service if the customer is disconnected for the few seconds required to take the reading.

The distinct advantages of using pole-mounted regulators are many. Application and installation can be made very easily, and no major reconstruction of the line is involved. Being completely automatic, they require virtually no supervision or maintenance.

Because of savings that can result from their use, they can often pay for themselves by increased revenue in as little as 1½ years. At the same time, customer relations are being improved and far more satisfactory service is provided.

Code discussion

(*Continued from page* 33)

a grounded surface.

It was brought out that the color green was now reserved for the grounding conductor to ground the frame of equipment.

Mr. Segall called attention to the new requirements of Section 2115-b. Considerable discussion resulted.

Someone wanted to know if a portable plug-in space heater could be considered as fixed equipment. The answer was no.

The next question was, "What is the reaction to the use of the proposed loop system for house wiring?" After some discussions and diagrams it was not favorable to those present.

The next question was, "Are ceiling lights in hospital operating rooms over 150-watt required to be explosion proof?" One member of the panel stated that the wattage of the lamp was not the problem. Sections 5135-b-2 and 5135-d were read. It was agreed that the lamps should be protected.

George Flach called attention to Section 5135 d-3 which refers to Section 5019-b-2 and answers this question very well.

At the start of the Tuesday afternoon session, Dewey Johnson made a motion that this section go on record that we consider the new wiring material "Flexicore" as an undeveloped product and the fact that it is on display is not an endorsement or approval by our group. The motion was seconded and duly passed.

The code panel again assembled and this time Frank G. Camus acted as moderator.

The first question presented was, "Why does section 2303-a limit the voltage to 300 volts for bare conductors?" The panel agreed there was no good engineering reason, only a compromise by the utility companies.

Someone wanted to know if we could enforce the fine print after Section 2331. The answer was no,

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- Meets Fed. Specs. W-R-151-a.
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as "fine" print in the Code represents only recommendations.

Mr. Flach wanted to know if the code would permit relays to be mounted in junction boxes with covers secured to the box by machine screws. Mr. Segall answered yes, but considerable study of this proolem resulted in a divided decision. Mr. Flach read Section 93701-c. This would mean that boxes of this type over 100 cubic inches could not enclose anything but joints in conductors. They are not intended to enclose switches, cutouts or other control devices.

The panel then agreed that if a box with a cover secured by machine screws is used the answer is no. If, on the other hand, a hinged cover is used, then it would meet the code requirements.

Charles Smith stated that he would see that these requirements in the construction section will be brought also in other appropriate sections of the Code.

The next question was, "Is it permissible to interconnect neutrals in more than one location?" It was the opinion of the panel that this was not the intention of the code rule.

Someone wanted to know if he could use the structural steel frame of a building for a ground. The answer was yes, if the steel was effectually grounded.

The next question was, "Is it necessary to pull R-L wire to pole standards when located less than 20 feet from the dispensing island?" Mr. Segall answered that any type wire approved for the purpose may be used.

Wednesday morning session started early with the code panel and B. Z. Segall as moderator.

The first question was, "Is a vapor proof fixture acceptable in a pit of a commercial garage?" At first everyone said no. President McDonald asked us to study Section 5105 b-3. After some discussion, it was believed that under certain conditions the inspector could accept vapor tight fixtures.

A vote of those present proved that most inspectors would require explosion proof fixtures.

A very interesting and educational discussion was had on the effects of using a reduced size neutral for fluorescent light loads. Mr. Soares stated that the code should be amended to take care of this situation.

Mr. Ward made a motion that a Committee be set up to study this problem of neutral size for fluorescent lighting loads.

Mr. Brandon stated that he would refer this to I.A.E.I. Panel No. 2 for study. Mr. Ward withdrew his motion.

Someone wanted to know why is it that the bare neutral was only permitted for service conductors? Everyone was quiet. No one felt like answering this question, however, it was brought out that a bare neutral was permitted in service entrance cable. Service entrance cable with a bare neutral may be used for ranges, clothes driers, and domestic water heaters.

The next question, "Does the code permit bell or signal wires to come in contact with house wiring?" The answer was no, but it may be in contact with nonmetallic sheathed cable or any other cable or raceway.

Mr. Tue brought up a very interesting discussion on pigeon hole parking buildings. It was suggested to Mr. Tue that he contact inspectors in Washington, D. C., Cincinnati, and New York City, to see how they handled this problem.

Frank Camus brought up a lively discussion on Section 5120 F-1. He wanted to know how most inspectors enforced this section; whether the union was above or below the seal fitting.

Mr. Soares read Section 5120 F-1 and with a diagram stated that the code definitely states where the "conduit enters the *pump*" (not the box). This would only mean that the union must be above the sealing unit.

This concluded the code discussions and the panel was dismissed and thanked for their fine work with especial thanks to Moderators Segall and Camus.

Lumber selector system

(*Continued from page* 30)

quired constant maintenance and frequently did not respond reliably with the result that selected boards often remained on the first conveyor.

The lumber mill wanted an accurate, reliable, maintenance-free tripping mechanism, a problem which was solved by the use of pull-off rollers with photoelectrically controlled engaging mechanisms.

When an extended board breaks the photoelectric beam, the control actuates air cyclinders of the pull-off rolls. These engage the board and slide it transversely down a gravity conveyor. The photoelectric control responds unerringly, and practically no maintenance is required.

Residential lighting

(*Continued from page* 25)

placed it with recessed floodlighting over the bed with two spots centered over each half of the bed because reading in bed was a family habit. Two-tube 20's of the deluxe vertical type were used for coloration at the clothes closets. Over the dressing area a 150-watt flood was used. It also served for general illumination. Switch controls of the reading lights and dressing area lights were placed over the bed.

In another bedroom a canopy bed lent itself effectively to valance lighting which was adjusted to position of a book. The switch was placed underneath the valance.

In a kitchen we got very pleasing results with two-tube six-foot slimline fixtures of the deluxe warm tone type that preserved the brilliant colors of ceiling and wall. A recessed fixture, it coincided

with the shape of the long narrow kitchen. Over the counter space across one wall of the kitchen, we used continuous strip molding for utility outlets. A 20-watt fluorescent light was placed under the range hood in the kitchen.

Controlled lighting

A dining room with an entire wall of sliding glass panels, that led to a terrace, was illuminated with valance lighting of two-tube continuous strips. At each side there were two circuit controls.

In another job of a remodeled home, adjustable fixture lights for controlled lighting were the only sources of illumination. A light was built into the center of an anemostat air conditioning register for symmetrical purposes.

There are no hard and fast rules with which to approach residential lighting. Family needs and residential conditions dictate usages. It becomes an art when imagination and ingenuity have to design lighting that will meet these specific conditions.

Residential lighting is lots of fun for these reasons, plus the experimentation that the newness of fluorescent in homes permits. We have found ourselves putting in temporary installations occasionally to test how agreeable residents found the results. It is a great satisfaction to be able to prove your point with a customer, and win appreciation on lighting with which you have experimented creatively.

And incidentally, successful residential lighting jobs frequently build up into large commercial jobs for a contractor.

Industrial lighting

(*Continued from page* 21)

For complete general office lighting, glass-enclosed two-lamp recessed units for 430 milli-amp, T-12 slimline, mounted on six foot centers at a mounting height of nine feet, with an initial level of eighty-five footcandles, furnish sixty-five footcandles of light.

An interesting aesthetic effect is the color of the ceiling. The ceiling material is a perforated aluminum panel scored to simulate 12-inch tiles, and is of a satin anodized finish. This has a high light reflectance, approximately 80 per cent, and is a neutral color. As the lighting is totally direct, only reflected light strikes the ceiling; therefore, the color of the furniture and floor is reflected and diffused there, giving the ceiling a combined color of the surroundings. As the ceiling is permanent in this characteristic, the ceiling may be forgotten at the time of redecoration.

The executive offices have been similarly furnished in good lighting practice, and lighted by geometric patterns of light to follow the shape of the room—a ten by eleven-foot office has a rectangle of light six by eight feet. The units are three-light fixtures wherein the tulamp and single lamp ballasts have been separately switched. By manipulation of these two wall switches, three approximately equal steps in level of light may be obtained. Here forty, seventy, and one hundred maintained footcandles are the levels.

Personalities involved

This lighting job was interesting in so many ways. The contrasts from the old to the new were strik-

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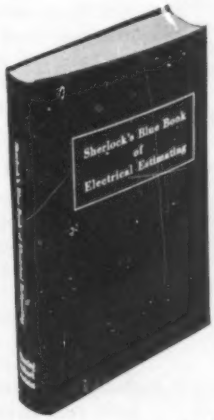

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ing. The personality problems with the plant workmen having their own ideas as to what the new should be, really were a challenge. The satisfaction of a very difficult job being completed in the best and easiest way, structurally as well as in consideration of illumination, was most pleasing.

Dixie plant owners have been very happy with the re-lighting job, so much so that to date three other Nashville printing plants have re-lighted directly or indirectly because of this successful outcome.

Wiring costs

(*Continued from page* 23)

the range installation, to remove the old two-wire entrance, main switch, etc., and install a three-wire entrance, he finds the badly overloaded circuits and other conditions that should have been corrected long ago and suggests that the whole installation be improved while he is taking care of the range. This is certainly a good suggestion. It is practical as far as service and safety are concerned, and is certainly beneficial to the customer. However, when the bid is made on the complete job, it seems no consideration is given to the fact that much of the re-wiring cost is incurred by requirements other than for the range, but the cry goes up that range re-wiring is excessive.

Possibility of lower cost

All these factors and conditions should be taken into consideration before making a blanket statement that wiring costs are "too high."

Taking an over-all view of the situation nationally, it is rather difficult to agree with such a statement. In those few instances where "gold-plating" is practiced, the situation can be corrected by correcting ordinance requirements.

In general, wiring costs could be minimized throughout the country if the general standards for installations were accepted and used, and if nationally recognized wiring practices were followed. Costs are always lowest and wiring installation better where nationally recognized wiring practices are followed.

Selling adequate wiring

(*Continued from page* 19)

Columbia for adequate wiring. Many homes which have been built during the past ten years are inadequately wired for anything but the smallest kind of an air conditioner and some of the house circuits are already so overloaded that no such load can be added without revamping the existing wiring.

Grudge against builder

Mr. Casteel said that it often comes as a shock when the owner of a comparatively new home learns that he has every modern convenience but wiring and he immediately feels he has a grudge against the builder who should have provided adequate wiring in the first place. Some such rewiring jobs run into considerable money which the owner has to dig up some way.

Some wiring is so inadequate and overloaded that even the addition of television starts the circuit breakers jumping.

Mr. Casteel said one of the more common situations is where the home owner buys a new refrigerator with several cubic feet more capacity than the old one and also places a deep freeze unit in the basement. Unless connected to a proper branch circuit the fuses may blow when both units operate simultaneously. On some circuits he has found both such units will operate at the same time but the circuit breaker will kick out when a 100-watt light is added.

On some rewiring jobs on comparatively new houses where the service was far from adequate, Mr. Casteel has found such things as Romex spliced in the wall and other wiring practices that will not pass adequate inspection.

Company policies

Mr. Casteel started his firm in 1929 and operates two trucks with utility bodies and a pickup truck. Strict attention to details and constant hammering for adequate wiring has brought business in good times and bad that keeps all the equipment of the firm occupied or a little behind.

In rush periods such as during the hot summer, Casteel uses a "first come, first served" system. Each customer must wait his proper turn. Some want priority treatment but Mr. Casteel believes if they once violate the sequence, they'll be sure to have trouble.

During a bad winter several years ago an ice storm covered trees and wires. Many services were interrupted by downed wires. He set up a priority system and a standard price for restoring service. When his crews were at one home, people next door requiring the same service endeavored to have his two-man crew do their job while they were there. He prohibited them from doing any of the jobs except as they were received at the office so that each customer would receive a fair deal. Mr. Casteel believes he might have lost some customers because he would not serve them out of turn, but he is certain that he gained many when they realized that he was observing strict priority.

In addition some fly-by-nighters came to town because of the rush of emergency business and solicited jobs of restoring service at about $30 a crack. Casteel's charge, based on standard rates averaged between $5 and $10. When customers found out that he had not raised prices because of the emergency, they told their friends and this generated new customers.

"Contractors and builders of homes should realize that the electrical contractor is a key man in their profit setup," Mr. Casteel says. "If he will listen to the sound advice of the electrical contractor on adequate wiring he will have a wiring job that will bring him repeat business."

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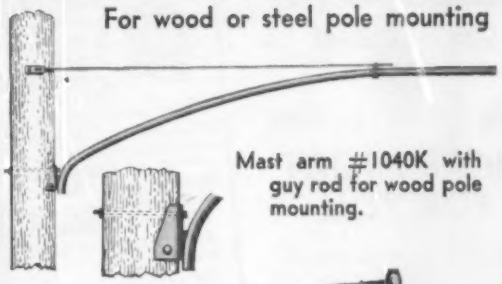
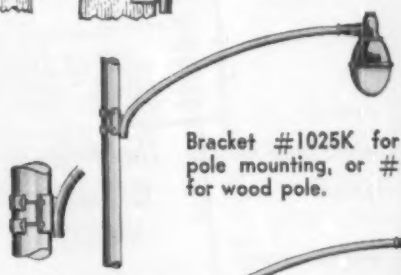


Mast arm #1040K with guy rod for wood pole mounting.



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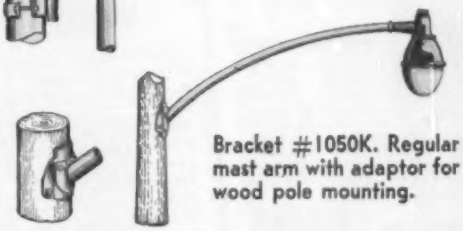

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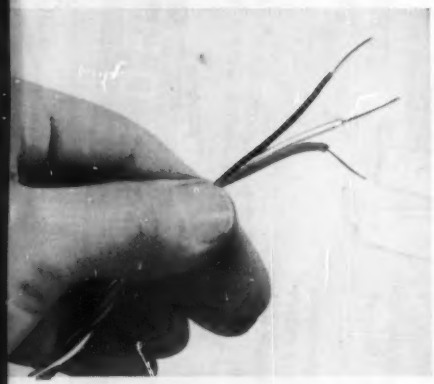

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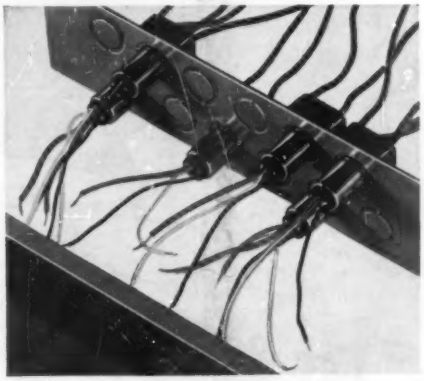

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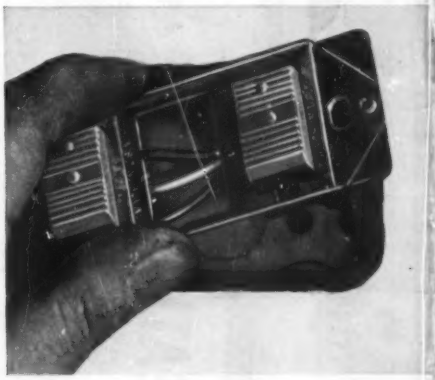

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